ENGINEERING NEWS-RECORD

DECEMBER 14, 1944

Pump plant for dewatering a 400-ft. deep lake for open-pit mining at Steep Rock project in Canada—see page 102

Featured in This Issue

PLANS FOR THE SASKATCHEWAN RIVER BASIN

For Sewer Engineers WHO ARE LOOKING AHEAD

Future-thinking engineers will be interested in this airport drainage story: To provide a stream enclosure over which a new runway could be constructed, 1570 feet of 54-inch pipe was required. Strength and durability were essential. Designers solved the problem with Asbestos-Bonded Paved Pipe.

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It will pay you well to keep Asbestos-Bonded ARMCO Sewer Pipe in mind for post-war projects even though you may not be able to get it for immediate construction. After the war it again will be available to help solve your toughest sewer problems. Armco Drainage Products Association, 15 Curtis Street, Middletown, Ohio.

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WALDO G. BOWMAN, *Editor* ALBERT E. PAXTON, *Manager*

...L. 133 DECEMBER 14, 1944 No. 24

...OMING NEXT

...Plans for the invasion of the European continent had taken firm ...ape by the summer of 1943. These ...ans envisioned great aritficial har...rs on the Normandy beaches ...rough which uninterrupted delivery ...men, materials and supplies could ...ss. Installation of these facilities ...ll be described in the Dec. 28 issue. ...though most of the spectacular ...ements of the harbor construction ...re destroyed by a storm before ...y could be put to use, this in no ...y dims the achievement of their ...stallation.

...By the use of special equipment, ...e Ohio Department of Highways is ...acing 125,000 gal. of traffic guide ...ipes on 10,500 miles of road each ...ar at a rate of 15 mph. and at an ...plication cost of $2.30 per mile. ...int is air-agitated, atomized and ...own on the pavement. This cost ...mpares with $12.50 per mile by a ...rmer method. Equipment and pro...dure will be described in the Dec. ... issue.

...Pressure grouting with soil-cement ...s been found economical for stabil...ation of low-bearing foundation ...ils for housing structures. The ...uipment used in this work and the ...ethod of applying the grout will be ...scussed in *ENR* for Dec. 28.

...OOKING AHEAD

...What size and weight limits should ... set for highways built after the ...ar is a question now being actively ...scussed by highway engineers. The ...ational Interregional Highway Com...ittee has made recommendations for ...e projected Interregional Highway ...ystem and the American Trucking ...ssociations still higher limits. Per...nent facts bearing on this question ...e to be given in the Annual High...ay Number, Jan. 11.

...When the new Congress assembles, ...e of the matters to be acted upon ... the Senate is a treaty with Mexico ...lating to waters of the Rio Grande, ...yuana and Colorado rivers. This ...eaty is opposed by Arizona and ...alifornia because of its bearing on ...e Colorado. Details of the treaty ...d arguments for an against it will ... summarized in an article to ap...ear early in 1945.

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Due to the paper shortage, no index for volume No. 133 (July-December, 1944) will be issued except to subscribers who ask for it. If you want a copy of the index please send in the coupon below.

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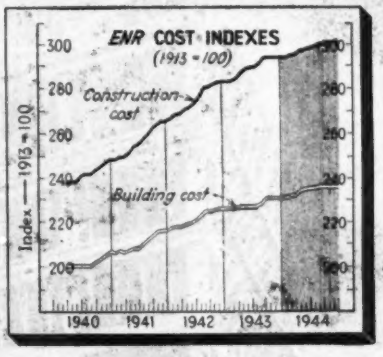
DECEMBER CONSTRUCTION BUSINESS REPORT

ENR CONSTRUCTION VOLUME AND NEW PRODUCTIVE CAPITAL

(,000 omitted)	November 1943 (4 wk.)	November 1944 (5 wk.)	% Change†	Eleven Months 1943 (47 wk.)	Eleven Months 1944 (48 wk.)	% Change†
Total U. S. Construction	$203,632	$129,740	−49.0	$2,885,384	$1,636,496	−44.0
Private Construction	73,195	34,372	−62.0	450,099	348,221	−24.0
Public Construction	130,437	95,368	−41.0	2,435,285	1,288,275	−48.0
Federal	123,064	79,390	−48.0	2,249,373	1,057,870	−54.0
Total New Productive Capital	$21,854	$39,381	+44.0	$3,065,104	$1,684,869	−46.0
Private Investment	21,854	35,381	+30.0	145,588	276,129	+86.0
Federal (non-federal work)	.....	4,000	.....	165,678	144,940	−14.0
Federal (federal work)	.....	.....	.....	$2,753,838	$1,263,800	−55.0
ENR Construction Volume Index, 1913 = 100	149	74	−50.0	182*	99*	−46.0

†Adjusted for difference in number of weeks reported. *Eleven-month average.



CONSTRUCTION COSTS . . . WAGE RATES . . . MATERIAL PRICES

	December 1943	December 1944	% Change	Changes November to December 1943 Nov.	1943 Dec.	%	1944 Nov.	1944 Dec.	%
ENR Construction Cost Index, 1913 = 100†	294.51	302.30	+2.6	294.41	294.51	**	301.09	302.30	+0.4
ENR Building Cost Index, 1913 = 100†	231.49	236.51	+2.2	231.39	231.49	**	236.10	236.51	+0.2

†Does not reflect increased costs due to overtime, lower labor efficiency, delivery delays, etc.

ENR 20-CITIES' AVERAGE

Common Labor	$0.869	$0.890	+2.4	$0.869	$0.869	0	$0.886	$0.890	+0.5
Skilled Labor (Av. 3 trades)	1.620	1.641	+1.3	1.620	1.620	0	1.641	1.641	0
Bricklayers	1.715	1.739	+1.4	1.715	1.715	0	1.739	1.739	0
Structural Ironworkers	1.673	1.698	+1.5	1.673	1.673	0	1.698	1.698	0
Carpenters	1.472	1.487	+1.0	1.472	1.472	0	1.487	1.487	0
Cement, per barrel	$2.62	$2.69	+2.7	$2.61	$2.62	+0.4	$2.69	$2.69	0
Reinforcing steel, cwt.	2.79	2.79	0	2.79	2.79	0	2.79	2.79	0
Structural steel, base	2.10	2.10	0	2.10	2.10	0	2.10	2.10	0
Sand, per ton	1.23	1.25	+1.6	1.25	1.23	−1.6	1.25	1.25	0
Lumber, 2x4 Fir, per M ft.	53.20	55.32	+4.0	53.20	53.20	0	54.58	55.32	+1.4
Lumber, 2x4 Pine, per M ft.	48.96	53.44	+9.2	48.78	48.96	+0.4	53.44	53.44	0
Common Brick, per M	16.15	18.39	+13.3	16.20	16.15	−0.3	17.22	18.29	+6.2
Ready-mixed concrete, c. y.	7.42	7.46	+0.5	7.38	7.42	+0.5	7.46	7.46	0
Struct. clay tile, 3x12x12	79.34	82.00	+3.4	79.34	79.34	0	81.30	82.00	+0.9
Paving asphalt, cars, ton	15.35	15.43	+0.5	15.35	15.35	0	15.43	15.43	0

**Less than .05 percent change.

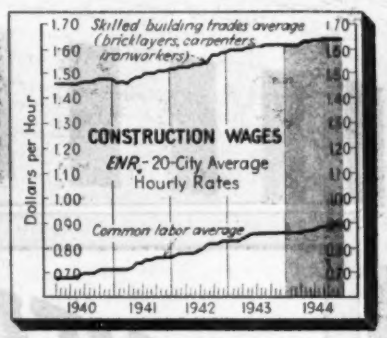
ENR INDEX NUMBERS

Base = 100	Construction Cost 1913	Construction Cost 1926	Building Cost 1913	Building Cost 1926	Volume '13	Volume '26
Dec., 1944	302.30	145.32	236.51	127.85	...	...
Nov., 1944	301.09	144.73	236.10	127.63	74	33
Oct., 1944	301.06	144.72	236.00	127.57	91	40
Sept., 1944	300.46	144.43	236.00	127.57	85	37
Aug., 1944	300.42	144.41	236.09	127.62	121	53
July, 1944	299.94	144.18	235.55	127.33	114	50
June, 1944	298.72	143.59	235.33	127.21	91	40
May, 1944	298.09	143.25	234.80	126.93	100	44
April, 1944	297.70	143.10	234.50	126.76	106	46
Mar., 1944	295.34	141.97	232.32	125.59	103	45
Feb., 1944	295.05	141.83	232.03	125.43	86	38
Jan., 1944	294.57	141.60	231.55	125.17	114	50
Dec., 1943	294.51	141.57	231.49	125.14	103	45
Nov., 1943	294.41	141.52	231.39	125.08	149	65
1944 (Av.)	298.64	143.59	234.73	126.89	...	...
1943 (Av.)	289.95	139.38	228.75	123.66	176	77
1942 (Av.)	276.31	132.82	222.39	120.22	553	243
1941 (Av.)	257.84	123.95	211.46	114.32	375	164

MATERIAL SHIPMENTS . . . . . BUILDING PERMITS

	November 1943	November 1944	% Change	Oct. 1944	% Change, Oct.-Nov.
Steel (% operating capacity) A. I. S. I.	98.9	95.8	−3.1	96.1	−0.3

	October 1943	October 1944	% Change	Ten Months 1943	Ten Months 1944	% Change
Fabricated structural steel, tons, A. I. S. C.	80,093	48,459	−39.5	749,462	437,511	−41.6
Cement, thous. bbl., U. S. B. of M.	11,288	10,263	−9.1	113,520	82,259	−27.5
Building Permits, 215 cities, Dun & Bradstreet (,000 omitted)	$48,228	$105,428	+118.6	$418,360	$679,660	+62.5



COST OF LIVING INDEXES . . . EMPLOYMENT

	October 1943	October 1944	% Change	Sept 1944	% Change Sept.-Oct.
Cost of Living Index, N. I. C. B.	103.7	105.1	+1.4	105.0	+0.1
Rent (Housing) Index, N. I. C. B.	90.8	91.0	+0.2	90.9	+0.1
Total Employment (est.) thous., B. L. S.	39,718	38,481	−3.1	38,593	−0.3
Constr. Employment (est.) thous., B. L. S.	1,002	637	−36.4	679	−6.1

ENGINEERING CONSTRUCTION CONTRACTS — ENGINEERING NEWS-RECORD — NOVEMBER, 1944

Engineering News-Record *reports continental U. S. Construction projects of the following minimum costs—waterworks, excavation, drainage and irrigation,* $15,000; *other public works,* $25,000; *industrial buildings,* $40,000; *other buildings,* $150,000

Five Weeks—Thousands of Dollars (000 Omitted)

	New England	Middle Atlantic	South	Middle West	West of Mississippi	Far West	United States November 1944	United States Eleven Months 1944	United States Eleven Months 1943	Canada
Public Works										
Waterworks	79	214	1,160	292	623	306	2,674	30,298	44,234	120
Sewerage	112	523	743	165	509	1,216	3,268	30,306	37,223	.....
Bridges, public	55	91	503	56	157	320	1,182	13,590	19,285	.....
Earthwork and waterways	155	209	1,835	225	450	583	3,457	62,588	43,476	40
Streets and roads	97	3,163	1,898	1,197	3,283	1,759	11,397	184,756	219,129	179
Buildings, public	959	7,109	2,116	5,002	7,154	24,723	47,063	614,493	1,338,503	1,021
Unclassified, public	530	3,563	8,517	1,871	3,903	7,943	26,327	352,244	733,435	803
Total public	1,987	14,872	16,772	8,808	16,079	36,850	95,368	1,288,275	2,435,285	2,163
Federal government (included in above classifications)	1,640	10,965	13,243	6,300	12,017	35,225	79,390	1,057,870	2,249,373	.....
Private										
Bridges, private	.....	.....	.....	.....	12	13	25	1,485	3,876	.....
Industrial buildings	796	4,332	173	2,128	7,998	2,019	17,446	166,126	148,228	3,042
Commercial buildings	600	5,367	500	3,150	3,085	881	13,583	134,270	211,645	624
Unclassified, private	257	532	128	156	1,621	624	3,318	46,340	86,350	.....
Total private	1,653	10,231	801	5,434	12,716	3,537	34,372	348,221	450,099	3,666
Total Engineering Construction:										
November, 1944 — 5 weeks	3,640	25,103	17,573	14,242	28,795	40,387	129,740	.....	.....	5,829
October, 1944 — 4 weeks	5,812	14,939	13,293	10,458	50,889	31,804	127,195	.....	.....	19,690
November, 1943 — 4 weeks	9,433	22,987	42,439	24,001	68,672	36,100	203,632	.....	.....	6,656
Eleven Months — 1944	48,403	247,726	366,057	197,444	317,367	359,499	.....	1,636,496	.....	105,497
Eleven Months — 1943	137,153	376,472	641,844	347,254	688,911	693,750	.....	.....	2,885,384	111,935

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ENR-H-68

The Week In Engineering and Construction

ENGINEERING NEWS-RECORD • DECEMBER 14, 1944 • VOLUME 133 • NUMBER 24

Congress completing work on major construction bills

Senate approved Flood Control and Rivers and Harbors Bills but eliminates St. Lawrence project. Both Houses approve Highway Bill.

Final action on the billion-dollar Flood Control Bill is expected in Congress before the end of this week. On Saturday the conference committee to which the Senate and House versions of the bill had been referred reported that it had completed its work, accepting all the projects added to the bill in the Senate (*ENR* Dec. 7, vol. p. 715). Additions made by the Senate brought the total work authorized by that bill to over $1,100,000,000. On Tuesday the Senate gave its approval to the Conference Committee report on the bill.

A major item in the bill as it came from the conference committee is $400,000,000 to start the coordinated program of the Army Engineers and the U. S. Bureau of Reclamation for development of the Missouri River basin. Details of that program are given on vol. p. 757 of this issue. Projects set forth in House Document 475 and Senate Document 191 of the current session of Congress, as revised and coordinated by Senate Document 247, were approved in the Senate version of the bill, which probably has been accepted by the conference committee, and initial work on those projects can be started as soon as money is appropriated.

Actual appropriations will not be made until after the new Congress assembles. Also, War Production Board approval will be necessary before actual construction can start.

St. Lawrence project rejected

The Senate passed its version of the Rivers and Harbors Bill on Tuesday after voting down an amendment that would have authorized the start of work on the St. Lawrence seaway project. This action was taken despite a message from the President asking for quick action on the seaway.

Also stricken from the bill were two controversial projects previously stricken from the House bill. These are a $66,000,000 waterway connecting the Tennessee and Tombigbee Rivers and a $40,000,000 project for canal from the Ohio River to Lake Erie.

The Senate struck from the bill the so-called "Elliott rider," which would have suspended reclamation laws that now make it impossible for any tract of land larger than 160 acres to receive water from the Central Valley project in California.

Highway Bill passed

Both Houses of Congress approved the conference report on the Postwar Highway Bill on Tuesday and sent it to the President for signature. The conference report accepted the House figure of $500,000,000 federal aid annually for three years. It also proposed that the government pay one-third the cost of acquiring right-of-way.

Newton Dam in Utah soon to be completed

Early in 1945 the Bureau of Reclamation expects to complete the Newton Dam project on Clarkston Creek in Cache County, Utah, near the town of Logan. The dam was begun a few years ago by the Work Projects Administration but was later shut down for several months because of priorities. It is now being completed as a war measure to increase food production.

An earthfill dam with a maximum height of 109 ft. and a crest length of 640 ft. is required to provide a 2,500-acre-ft. reservoir to irrigate 2,225 acres.

Estimated cost to the bureau, which is represented on the job by I. Donald Jerman, resident engineer, is $595,000.

• • •

RFC warehouse plan calls for some building

Construction of some new warehouses for the storage and sale of surplus war supplies and equipment is proposed by the Reconstruction Finance Corporation, according to an announcement by Jesse Jones, Secretary of Commerce. Mr. Jones denied earlier reports that the RFC planned to build many new warehouses throughout the country at costs running to many millions of dollars. As far as possible, Mr. Jones said, existing warehouses would be used.

The RFC recently received bids on the construction of four warehouses in the Westchester yards of the New Haven R.R. in the Bronx, New York City.

Western Society of Engineers holds its 75th anniversary at Chicago

Honorary membership conferred on Daniel W. Mead and George T. Horton. Engineering development of Midwest reviewed.

At a dinner meeting attended by 400 members and guests in Chicago Dec. 5 the Western Society of Engineers celebrated the 75th anniversary of the founding of the association in 1869, awarded honorary membership to two distinguished engineers and listened to Robert R. McCormick, publisher of the Chicago *Tribune*, outline the history of the lake level controversy and Chicago's struggle to get more diversion through the drainage canal. Part of the anniversary program was the presentation of 13 papers on engineering history and development in the Chicago and Midwest, published in a special issue of the society's journal. Copies of the publication were distributed at the dinner, and the various authors were introduced to the audience with complete biographical sketches.

Active in many fields

The papers were particularly significant for the occasion, for members of the association have always been closely connected with the railroad, communications, utility and industrial development of Chicago and the surrounding territory. Many of the early officers were pioneers in their fields of engineering. Various topics were covered by the following authors: Steel—Wilfred Sykes, president, Inland Steel Co.; railroads—Ralph Budd and R. C. Overton, Burlington R. R.; electric power—Harry B. Gear, former vice president, Commonwealth Edison Co.; bridges—Albert Reichmann, former vice president, American Bridge Co.; telephone—Wm. O. Kurtz, vice-president, Illinois Bell Telephone Co.; hydraulic and sanitary engineering—Chas. B. Burdick, consulting engineer; local transportation—Philip R. Elfstrom, general manager, Chicago, Aurora & Elgin R. R.; water supply—Loran D. Gayton, assistant city engineer of Chicago; buildings—Frank R. Randall, consulting engineer; gas—Robt. B. Harper, vice president, Peoples Gas Light & Coke Co.; telephone manufacturing—Arthur B. Smith, Automatic Electric Co.; engineering education—Henry T. Heald, president, Illinois Institute of Technology; and engineering leadership—Frank F. Fowle, consulting engineer.

Certificates of honorary membership in the Western Society of Engineers were presented to Dr. Daniel W. Mead, professor emeritus of hydraulic and sanitary engineering, University of Wisconsin, and to George T. Horton, president, Chicago Bridge & Iron Co.

Lake level controversy

Mr. McCormick, who admitted he "knew more about the lake levels than any other man alive" suggested that now is the opportune time to reopen the question of increased diversion from Lake Michigan through the Chicago Drainage Canal because of the importance of the canal as a wartime waterway. He pointed out that ships are being built at Great Lakes ports that are too big to be sent out through the Welland or Erie canals, so they must come through Chicago on their way to the sea. The canal was the result of expenditures of 100 million dollars by Chicago and Illinois and these "communities have done something for the war program which no other community has done." He sees the canal not only as a war service, but "a permanent contribution to the welfare of the U. S."

He declares the U. S. Supreme Court decision ordering the diversion cut to 1,500 sec. ft. was "the result of a series of circumstances which had little to do with the facts in the case." Natural cycles, he said, affect the lake levels far more than would the maximum amount of diversion ever proposed for the drainage canal.

Philip R. Elfstron, current president of the society, presided at the meeting. Frank F. Fowle was toastmaster. All past presidents in attendance were presented, as was also Leigh S. Keith, veteran secretary.

Ask $50,000 to extend Cleveland fire inquiry

Extension of the scope of the investigation into the fire and explosion at the East Ohio Gas Co. liquefying plant to cover the safety factors of comparable industrial installations is recommended by the technical consultants on the mayor's board of inquiry (*ENR* Nov. 2 vol. p. 535 and Nov. 16, vol. p. 604).

In a report on the progress of the inquiry, the five technicians on the board of ten estimated that four months and a total of $50,000 would be required to complete the study of the East Ohio catastrophe and allied questions, and asked authorization and appropriation for the work.

In its progress report, the board said the fire and explosions which devastated a half square-mile area of Cleveland last Oct. 20 occurred because of causes unknown in the "design, construction or control of this unique process for the liquefaction of natural gas and its storage at −260° F."

Testimony of witnesses has established a certain sequence of events. Vapors were seen escaping from a cylindical storage tank, followed by flame and a series of explosions. Soon after, a nearby spherical tank toppled, its supporting columns probably buckled by the heat. Control charts in the plant showed no long-continued deviation from normal operation.

The questions which the technical men will seek to answer with a "supportable hypothesis" are whether the failure of the cylindical tank was due to inadequate foundations, to structural weakness as designed, to a change in the physical properties of the metal under long exposure to low temperature, to ground tremors or vibrations from machinery; or whether it was a secondary failure precipitated by excessive pressure, fire or shock coming from adjacent equipment or failure to control the process properly.

In explaining to a committee of city councilmen the desirability of an exhaustive inquiry, Prof. George E. Barnes, of Case School of Applied Science, who heads the technical group, pointed out that while the gas company had announced its intention to abandon the gas liquefying plant, facts and principles discovered would be valuable in prescribing safe regulations for the storage of inflammable liquids or gases in other industrial installations.

Original appropriation requested for the investigation was $20,000. Costs to date have totaled about $5,500.

Nearly a month was required to clear the site of the fire so that further studies might proceed. Heavy steel fragments were scattered over a diameter of about 1,000 ft.

Gas company employees completed the delicate job of regassifying liquid gas in the remaining two tanks, using steam from a railroad locomotive, and breaking connections between the damaged equipment and feeder mains to the city.

In a previous report on the investigation (*ENR*, Nov. 16, vol. p. 604) it was incorrectly stated that a city ordinance had been passed restricting the location of such plants. This ordinance is still pending. The public hearings were concluded Nov. 22, not during the week of Nov. 12, as stated in that report.

Highway plans for 1945 outlined at Illinois Road Builders meeting

C. M. Hathaway, engineer of construction, says only most necessary road building and repairs will be done while war lasts

Illinois' road construction for 1945 will be confined to a continuation of the present program of reconstruction and replacement work on strategic highways which have passed the point of economical maintenance and which carry important wartime traffic; patching of concrete pavements; bituminous resurfacing; and building of necessary access roads. This is according to C. M. Hathaway, engineer of construction, Illinois State Highway Department.

As principal speaker at the annual meeting of the Illinois Road Builders Association in Chicago on Dec. 4, Mr. Hathaway told 225 engineers that no new construction is anticipated on Illinois highways for the duration except such as may fall in one of the above classifications.

Despite the extensive reconstruction and maintenance program executed during the past three years there are still many primary highways in the state's strategic network that carry intensive wartime traffic. Such pavements have been broken down to the point where they may not last throughout the winter (said Mr. Hathaway), much less through 1945. Unquestionably all of this work must be considered as reconstruction projects for next year, he said.

No extravagant expenditure

Mr. Hathaway emphasized that Illinois' highway program for the first year or two after the war does not call for extravagant expenditure on projects which are not economically justified, but it must of necessity include those reconstruction projects considered some four years ago on which construction was deferred because of the war.

In view of the fact that the net state gasoline tax collections, from which Illinois receives its highway building revenues, have been reduced from $44,650,000 in 1941 to $28,903,000 in 1943, the state will have only $10,000,000 annually for new construction, declared Mr. Hathaway. A comprehensive postwar highway program has been developed, however, and the more important projects have been selected. As engineers on construction work have become available during the winter months, this design work has proceeded as rapidly as possible.

In reviewing the 1944 reconstruction and maintenance program, Mr. Hathaway pointed out that an estimated $9,803,000 will have been spent by the end of this year. A total of 783 mi. of concrete pavement was patched this year at a cost of $1,358,000. The bituminous resurfacing program involved the expenditure of $3,751,000 on 178 mi. of road. In addition, 271 mi. of seal coat was placed on old bituminous surfaces, mostly on the secondary system. Access road construction included the relatively low expenditure of $577,000 while flood relief, bridge painting and miscellaneous bridge, paving and grading work amounted to $1,151,000. Several large projects also were completed this year involving both reconstruction and concrete patching at a cost of $1,527,000. Pavement reconstruction on U. S. Route 66 has amounted to $757,000 and two large resurfacing jobs within the city of Chicago cost $682,000.

Transit-mix concrete

Although (on account of limitations on materials and equipment,) Mr. Hathaway was reluctant to forecast any changes in postwar construction methods he did comment on a few features which have developed during recent years. One of these is the successful adoption of transit-mix concrete for patching, and for bridge and culvert work. This equipment has become so well recognized that the construction committee of the A. A. S. H. O. is considering the adoption of a new set of specifications to cover transit mixers, he said.

Concrete curing has taken a curious turn, due to war conditions, asserted Mr. Hathaway. At the present time membrane curing is of necessity the most favored method but just what the results will be when burlaps and paper become available again is a matter of conjecture. Two features of membrane curing, however, will require further study before its ultimate adoption. One is a satisfactory test for the material itself; the other is suitable equipment for its application.

In closing, Mr. Hathaway expressed the opinion that new designs for concrete pavement, namely, 10-in. thickness with mesh reinforcement, have demonstrated quite forcibly that the 34-E paver, equipped with either single or double drum, is an economic necessity for any contractor if he is to meet present-day standards.

Donald O. White, president of White Consolidated, Chicago, is the newly elected president of the association, succeeding Henry Fowler, who died last month. Other new officers are: L. L. Shidler, Kankakee, vice president; A. R. Ramser, Chicago, treasurer; and A. B. McDonald, Wadsworth, secretary. Taylor G. Soper was reappointed executive secretary.

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S. O. Harper retires; chief engineer of U.S.B.R.

Sinclair O. Harper, chief engineer of the U. S. Bureau of Reclamation, retired on Dec. 10. He has been chief engineer of the bureau and head of the Denver office since 1940.

Born in Pacific Grove, Calif., in 1883, Mr. Harper graduated from the University of California in 1907 as a civil

engineer and immediately entered the service of the Bureau of Reclamation as an assistant engineer on the Grand Valley project in Colorado. Ten years later he was made project manager there, continuing in that position until 1925, when he was moved to Denver to become general superintendent of construction and assistant chief engineer. In this capacity he had general supervision over construction procedures at all the bureau's great projects built in the period 1925-1940, including Boulder Dam, Grand Coulee Dam and the All-American Canal. All the engineering work of the bureau has been under his general direction since 1940. Also, from 1935 to 1939 he served as head of the commission that negotiated the agreement between the states of Colorado, New Mexico and Texas with respect to waters of the Rio Grande.

Proposed Missouri Valley Authority opposed by midwest organizations

Mississippi Valley Association and Associated General Contractors prefer combined Army and Reclamation Bureau plan

There is considerable opposition in the middle west to the Missouri River basin development plan to be supervised by a Missouri Valley Authority, as recommended to Congress by the President (*ENR* Nov. 31, page 667). This opposition was voiced—before the President's recommendation was made—at the annual convention of the Mississippi Valley Association in St. Louis on Nov. 27, when Representative Will M. Whittington, of Mississippi, chairman of the House Committee on Flood Control, told the delegates that the plan was impracticable and dangerous to both flood control and irrigation.

Brig. Gen. R. C. Crawford, U. S. Army division engineer, Missouri River division, was another opponent of the "MVA" plan. He recommended endorsement of the combined Army Engineers and Bureau of Reclamation plans for the development of the Missouri River basin as contrasted with the plan which the President is urging Congress to adopt.

At earlier meetings in St. Louis and Kansas City, the Associated General Contractors of Missouri had gone on record as opposed to the MVA idea.

Opposition was on the ground that it would create a super state imposed upon nine states as far as the regulation and use of the Missouri River is concerned. Furthermore, the contractors agreed, a MVA would put the development of the Missouri River in the hands of a new agency of the government when such a change is unnecessary and undesirable. The Corps of Engineers of the War Department has had supervision of flood control and navigation on the Missouri River for many years. Its work, speakers said, has been done efficiently and economically by expert engineers. Their years of study of the river have given them more knowledge of the problem than is possessed by any other group, their work up to this time has proved to be based on sound engineering principles, and they have utilized the services of private industry in making improvements on the river. Moreover, they have presented a comprehensive plan for flood control and navigation on the river. Missouri contractors, therefore, urge that the Flood Control Bill and the Rivers and Harbors Bill, now before the United States Senate, be passed, and that the creation of a Missouri Valley Authority be opposed as a policy.

Eighty men attended the Kansas City meeting and 58 men were at the St. Louis meeting. The discussion of the Missouri Valley Authority was led by Lee Metcalfe in Kansas City and by Morris E. DeWitt in St. Louis.

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ENR Editor Bowman on overseas mission

Waldo G. Bowman, editor of *Engineering News-Record*, left recently on a war correspondent assignment to the European theater of operations, to report on military construction operations in France, Belgium, Holland and Germany. Port and harbor work, bridge erection, roadbuilding, camp and depot construction are among the activities that he expects to cover. Part of his attention will also be directed to the needs and plans for postwar reconstruction on the continent and in England, the latter supplementing observations in "Britain Looks Beyond the Battle" (*ENR* June 15, 1944, vol. p. 890), which he wrote after his visit last year. He expects to be gone most of the winter.

As on his previous trip last year, when he visited the British Isles, North Africa and the Middle East, Mr. Bowman will be attached to U. S. Army Engineers headquarters.

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Gotaas new director of Coordinator's division

Lt. Col. Harold B. Gotaas has been appointed director of the Health and Sanitation division of the Office of the Coordinator of Inter-American Affairs, which is engaged in the promotion of cooperative health programs in 18 Latin American countries. He succeeds Col. A. R. Dreisbach, a Medical Corps officer, who has been reassigned.

Colonel Gotaas, a Sanitary Corps officer, has been serving as assistant director and chief engineer of the division. He was assigned to the division in September, 1942, as chief of the engineering section with the rank of captain. Prior to this he was associate professor of sanitary engineering at the University of North Carolina.

Colonel Gotaas is a civil engineer graduate of the University of South Dakota, and received a master's degree and a doctor of science degree from Harvard University. In 1933 he served as city engineer of Vermillion, S. D.

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General Clay named to mobilization staff

James F. Byrnes, director of War Mobilization and Reconversion, has appointed a group of deputies to assist him in getting production from "the assembly line to the front line."

Major General L. D. Clay of the Corps of Engineers, who has been in charge of the Army Service Forces procurement program and has just returned from duty in the European theater, has been named deputy director for war programs and general administration. His primary responsibility will be to coordinate the programs of all agencies concerned with war production for the meeting of war schedules.

Fred Searls, consulting engineer of New York, who was with the Office of War Mobilization which preceded the OWMR until last March, will rejoin Mr. Byrnes' new staff and will assist General Clay in developing programs and establishing policies for the immediate stimulation of war production.

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Expanding facilities at Kaiser ship plant

Postwar operation of the Kaiser Co.'s Shipyard No. 3 in Richmond, Calif., is indicated by recently completed plans for conversion of five graving docks from ship construction to ship repair, announced by the Twelfth Naval District headquarters in San Francisco.

Considerable expansion of yard No. 3 facilities is involved, including construction of two finger piers, 553x50 ft., with reinforced concrete decks; construction of a rock-faced fill, about 1,600 ft., long adjoining existing graving docks, and installation of two temporary steel cofferdams projecting 70 ft. from the pierhead line of two graving docks. The cofferdams will make it possible to dewater two dock areas to deepen them for accommodation of larger vessels.

In yard No. 3 ships are built in five 600-ft. graving docks, instead of on sloping ways, so that ships are launched by flooding the basins. For ship repair, the system will be reversed so that vessels will be towed into the basin, seaward gates will be closed, and the water pumped out and repair work done in the dry.

Construction in 1945 may reach 4 billion

New construction in 1945 should approach $4 billion if Germany is defeated in the spring, according to figures just released by the War Production Board. If Germany is not eliminated the total will be only a little over $3 billion.

A breakdown of the WPB estimates is given in the accompanying table. The figures do not include repair work. In this respect they differ from estimates made by most other federal agencies.

Preliminary estimates of new construction during the year 1944 indicate a volume of $3,840,000,000, compared with $3,900,000,000 programmed for this year in August 1943..

Work financed by public funds accounted for only 61 percent of the 1944 total activity as contrasted with nearly 80 percent in 1942 and 1943. Activity volume for all major types of construction was less in 1944 than in 1943, with the sharpest decrease occurring in military construction such as troop housing, airfields and storage facilities, which declined to $730,000,000 from the $2,423,000,000 volume last year. Construction volume at government-financed industrial plants reached $735,000,000 for the year. This governmental industrial work represents only 37 percent of the 1943 activity of $1,973,000,000 and 21 percent of the $3,485,000,000 factory volume of 1942.

150th anniversary of French engineer school

The 150th anniversary of the great French military and engineering school, the Ecole Polytechnique, and the 25th anniversary of the exchange of cadets between that school and the U. S. Military Academy at West Point was celebrated in New York on Dec. 11 by a dinner at the Waldorf-Astoria attended by about 1,000 people. High ranking military and diplomatic officers from both nations were among the honored guests.

Established in Paris in 1794 as a civilian school, the Ecole Polytechnique was changed over to a military school by Napoleon I. Its graduates include many notable military leaders like Joffre and Foch, Citroen the industrialist and Frederic Le Play, economist.

Speakers at the dinner in New York included Robert T. Patterson, Under Secretary of War; Capt. Laurence A. Abercrombie of the Navy; Henri Hoppenot, minister of the Provisional French Government; Ernest Mercier, a French industrialist; and Pierre Aubert, head of the French engineer group in New York.

Mr. Mercier said that France hopes to obtain American construction equipment for reconstruction work and the assistance of American construction contractors. This work, he added, will be handled on a sound and equitable business basis.

Permanente Company cuts cement prices

Portland cement price reduction of 20¢ per barrel was announced Dec. 6 by the Permanente Cement Co. on all types of portland cement in northern California and western Nevada. The new prices, $1.75 per barrel in paper sacks, f.o.b. cars or trucks at the Permanente mill near Los Altos, Calif., and $1.45 per barrel in bulk, affect all shipments in that area except certain destinations within the following counties: San Joaquin, Stanislaus, Merced, Mariposa, Madera, Fresno, King, Tulare, Kern, Mono and Inyo in California, and Clark and Lincoln in Nevada.

Standard portland cement, in paper, for off-shore shipment from San Francisco and Oakland ports to established dealers in Hawaii, and to government agencies in the Pacific Ocean areas is priced as follows: f.o.b. cars or trucks at mill, $1.75 per barrel; f.o.b. railroad cars at dock, $1.88; f.o.b. trucks at dock, $1.95; f.o.b. dock unloaded from car or truck, $1.98.

The Permanente Co.'s announcement was followed by statements from other producers of portland cement in the area that they would meet the price reductions. These producers say that this price reduction is purely local in scope and will not affect other Pacific Coast prices.

As a matter of fact, price boosts of 20¢ per barrel were announced by Southern California producers just prior to the Permanente Co.'s price reduction.

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FWA allots $2,856,137 for community projects

Following presidential approval, Baird Snyder, Assistant Federal Works Administrator, has allotted $2,856,137 for 19 projects involving the construction of schools, health centers, sewers and water works, and for 20 others requiring FWA financial assistance.

All of the projects are in war-industry areas or near military installations and are needed to help the cities to provide community facilities for their swollen populations.

Among the communities affected are: Phoenix Ariz.; Oxnard and Anaheim, Calif.; Royal Oak and White Lake, Mich.; Brooklyn, Ohio; Decatur, Anniston, Phenix City, Talladega, and Huntsville, Ala.; Cedartown and Macon, Ga.; Moss Point, Miss.; Lawton, Okla.; Knoxville, Tenn.; South Antonio and Vidor, Tex.; Calcasieu, La.; Baltimore, Md.; and Fairbanks, Alaska.

ESTIMATED NEW CONSTRUCTION ACTIVITY IN THE UNITED STATES
(Millions of Dollars)

	1943	1944	1945	
			Full scale War Through the Year on Two Fronts	Assumes Defeat of Germany in the Spring—War with Japan Continuing
Total Construction	7,732	3,840	3,150	3,950
Total Pub.	6,144	2,354	1,680	1,860
Total Private	1,588	1,486	1,470	2,090
Military	2,423	730	480	450
Housing	786	222	135	125
Aeronautics	1,059	298	195	180
Other Military	578	210	150	145
Industrial	2,198	920	595	725
Pub. Financed	1,973	735	400	375
Priv. Financed	225	185	195	350
Housing	1,318	685	525	775
Pub. Financed	702	188	75	75
Priv. Financed	616	497	450	700
All Other Construction	1,793	1,505	1,550	2,000
Public	1,046	701	725	960
Community Bldgs.*	124	120	125	160
Highways	410	318	325	450
Sewer & Water	95	79	80	100
Conservation	244	142	150	185
Other Non-residential	173	42	45	65
Private	747	804	825	1,040
Community Bldgs.	96	133	145	200
Farm	160	170	195	245
Utilities†	491	501	485	595

* Schools, Hospitals, Recreational, Commercial and Religious Structures.
† Railroads, Gas, Pipe Lines, Electric Light and Power, Telephone and Telegraph.

Waco adopts municipal sewer tax ordinance

The City Commission of Waco, Tex., recently adopted a municipal sewer tax ordinance to become effective when local requirements for final adoption are satisfied. The purpose of the tax is to help provide funds for postwar municipal construction, pay off unrefunded city bonds, and relieve the strained financial structure of the city.

The tax is to be levied according to the number of sewer connections or fixtures of residences, apartments, rooming houses, hotels, and commercial users. Monthly rate of tax will be as follows: Residences, 30 cents minimum for two fixtures and 10 cents each for the next eight; apartments and hotels, $2.50 for one to twelve fixtures, 3 cents each for 12 to 24 fixtures, and 2 cents each for all over 24; commercial users, $1 for two fixtures, 10 cents each for the next two, 5 cents each for the next ten, and 3 cents each for all over 22. An extra charge of $1 a month is made for each dish washing machine and 75 cents a month for each wash rack.

Industrial users, classified according to the type of industrial waste, will be charged a certain percentage of their water bill. The charge will be 40 percent of the first $10 and will graduate from that point down to a low of 5 percent. Charitable institutions will pay $1 a month for the first 20 fixtures, 3 cents each for the next 80, and 2 cents each for all over 100. Users outside the city will be taxed 50 percent higher than city users.

The ordinance provides for disconnection of the sewer line if the sewer charge is not paid within 20 days.

JOBS OF THE WEEK

HOSPITAL, Washington, D. C.

Charles H. Tompkins Co., Washington, D. C., will construct a hospital for George Washington University, Washington, D. C., at an estimated cost of $3,000,000. Federal Works Agency will help finance. Faulkner & Kingsbury, Washington, D. C., are the architects.

QUARTERS, Cherry Point, N. C.

Bureau of Yards & Docks, Navy Department, Washington, D. C., has awarded a contract to build bachelor officers' quarters, family guest house, and messmen's barracks, at Marine Corps Air Station, to T. A. Loving & Co., Goldsboro, N. C., $1,448,576. James C. MacKenzie, New York, is the architect.

STORAGE FACILITIES, New Jersey.

Del Balso Construction Corp., New York, N. Y., has been awarded a contract for storage facilities for Industrial Surplus Storage Depots near Jersey City, Newark and Linden by U. S. Engineers, New York, N. Y., at $1,086,628.

PLANT, Locust Summit, Cumberland County, Pa.

American Briquet Co., Philadelphia, Pa., will construct a plant to manufacture briquet coal, with 1,000 tons daily capacity. Work will be done by separate contracts and the estimated cost is $1,250,000. Day & Zimmerman, Inc., Philadelphia, Pa., are the engineers and architects. Defense Plant Corp. will finance.

PLANT, St. Nicholas, Schuylkill County, Pa.

American Briquet Co., Philadelphia, Pa., will build a briquet coal plant by separate contracts to cost $1,250,000. Day and Zimmerman are the engineers and architects. Defense Plant Corp. will finance.

IMPROVING AIRFIELD, March Field, Calif.

U. S. Engineers, Los Angeles, Calif., awarded a contract for runways and taxiways at March Field, to Kiewit-Johnson-Everist, Los Angeles at $2,278,446.

HOSPITAL, Washington, D. C.

John McShain Inc., Philadelphia, Pa., has been awarded a contract for hospital by Georgetown University, Washington, D. C. The estimated cost is $2,000,000. Kaiser, Neat & Reid, Pittsburgh, Pa., are the architects. Federal Works Agency will finance.

AUTOMATIC SPRINKLER SYSTEMS, Maywood, Calif.

U. S. Engineers, Los Angeles, Calif., awarded a contract for installation of automatic sprinkler systems in 27 warehouses at Army Air Forces Supply Depot to Hickman & Ritter, Los Angeles at $835,111.

Note—Additional bidding and contract news on many projects large and small appear in the Construction News section beginning on page 223.

MEETINGS

National

CANADIAN CONSTRUCTION ASSOCIATION, annual meeting, Chateau Frontenac, Quebec, Canada, Jan. 15-17.

NATIONAL ASSOCIATION OF HOME BUILDERS OF THE U. S. postwar exposition and convention, Hotel Sherman, Chicago, Ill., Jan. 15-20.

AMERICAN ROAD BUILDERS' ASSOCIATION, 42nd annual meeting, Stevens Hotel, Chicago, Ill., Jan. 16-19.

AMERICAN SOCIETY OF CIVIL ENGINEERS, annual meeting, Hotel Commodore, New York City, Jan. 17-19.

Regional and Local

ASSOCIATED GENERAL CONTRACTORS OF MINNESOTA, 26th annual meeting St. Paul Hotel, St. Paul, Minn., Jan. 11-13.

LOUISIANA ENGINEERING SOCIETY, annual meeting, St. Charles Hotel, New Orleans, La., Jan. 11-13.

OKLAHOMA SOCIETY OF PROFESSIONAL ENGINEERS, annual state meeting, Huckins Hotel, Oklahoma City, Okla., Jan. 12-13.

NEW YORK SECTION, AMERICAN WATER WORKS ASSOCIATION, midwinter luncheon meeting, Pennsylvania Hotel, New York, N. Y., Jan. 17.

PHILADELPHIA DISTRICT, AMERICAN SOCIETY FOR TESTING MATERIALS, symposium on magnetic particle testing, Hotel Benjamin Franklin, Philadelphia, Pa., Jan. 22.

NEW YORK STATE COUNTY HIGHWAY SUPERINTENDENTS ASSOCIATION, annual meeting, Albany, N. Y., Jan. 24-26.

NORTH CAROLINA SOCIETY OF ENGINEERS, winter meeting, Hotel Sir Walter Raleigh, N. C., Jan. 26-27.

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Gasoline tax helps pay for Los Angeles streets

A highway program that will call for the expenditure by the state of California of $7,475,512.35 within the city of Los Angeles in the next two years was given approval by the city council Nov. 29.

Of the total, $2,215,790.76 would come from the ¼ cent gasoline tax allotted to the city by the state board of equalization, some of which already has accumulated because materials and manpower have not been obtainable for its use.

That portion of the total not provided by the ¼ cent gasoline tax would come direct from the state.

OBITUARY

O. N. Floyd, 66, a member of the executive committee, Construction Division, American Society of Civil Engineers, died at Dallas, Tex., Nov. 30. He was an authority on earthwork dams, and had served on many major dam projects, including the Denison Dam, on which he was a consultant. Mr. Floyd supervised the building of the Lake Dallas Dam. More recently he was a consulting engineer for the TVA project, and was one of a staff of consultants for various Army engineering projects. Recently he was in Canada and Alaska checking on the Canol oil project. He had been called to Panama twice as a consultant.

Robert Fulton Gifford, 56, engineer, died in Boston, Mass., Dec. 2. A graduate of the Worcester Polytechnic Institute, Mr. Gifford worked on engineering projects in many parts of the country and at one time was with a firm employed by the Russian government in Siberia. Formerly associated with the Stone & Webster Co., latterly he was employed by the E. B. Badger Co.

Frank H. Trow, 73, civil engineer, who supervised the construction of the Ashokan Dam of the New York City water system in the Catskills, and the Wachusett, Mass., Reservoir, died at Red Hook, N. Y., on Dec. 5. He was graduated from Dartmouth College in 1894 and from the Thayer School of Engineering at Dartmouth the next year. He was associated with the Boston Metropolitan Water Commission until 1912, when he became chief engineer for Winston & Co.

Col. Edwin J. Nowlen, 70, formerly an engineer for Philadelphia, Pa., died at Ventnor, N. J., Nov. 26. Colonel Nowlen was associated with the design and construction of the Fairmount Park trolley route and with various bridges throughout the city. He was a graduate of Drexel Institute of Technology.

John F. Sproatt, 55, engineer at Iowa City, Ia., died recently. A graduate of the University of Iowa, he was assistant county engineer of Johnson County at one time. He also served as city engineer at Iowa City from 1933 to 1937. For the last six years he has been in government work.

James W. Griffith, 50, Canton, S. D., who had been the highway superintendent for Lincoln County since 1936, died recently. He formerly was resident engineer at Sioux Falls, S. D., for the state highway department.

James C. Pinney, 62, who was associated with the U. S. Reclamation Bureau at Denver, Colo., died in that city Dec. 2. He was graduated from the college of engineering, University of Wisconsin in 1910. He then was appointed instructor at Marquette University, Milwaukee. From 1912 to 1917, he was Milwaukee's superintendent of bridges and buildings. From 1917 to 1924, Mr. Pinney was dean of the Marquette College of Engineering.

The Week *in Engineering and Construction*
Continued on page 124

CONTRACTS AND CAPITAL

CIVIL ENGINEERING construction volume in continental United States totals $129,740,000 for November, an average of $25,948,000 for each of the five weeks of the month. The November weekly average volume, not including the construction by military engineers abroad, American contracts outside the country, and shipbuilding, is 18 percent below the average for the four-weeks of October, and is 49 percent below the average for the four weeks of November, 1943.

Private construction for November, 1944, on the weekly average basis, is 22 percent higher than a month ago, but 62 percent lower than a year ago. Public construction is 27 and 41 percent lower, respectively, than last month and last year. Federal construction declines 22 percent from October, and is 48 percent below November, 1943. State and municipal average volume is 45 percent under last month, but tops the 1943 month by 73 percent.

The November engineering construction total brings 1944 volume to $1,636,496,000 for the 11-month period (48-weeks), a total 44 precent under the $2,885,384,000 reported for the 11-month period in 1943 (47 weeks).

CONTRACTS

Continental U. S. Only
(Thousands of Dollars)

	Week Ending Dec. 16 1943	Dec. 7 1944	Dec. 14 1944
Federal	$19,024	$12,451	$25,962
State & Municipal	2,188	4,148	1,841
Total public	$21,212	$16,599	$27,803
Total private	5,580	1,526	3,954
TOTAL	$26,792	$18,125	$31,757

Cumulative		
1944 (50 weeks)		$1,686,378
1943 (50 weeks)		$2,999,009

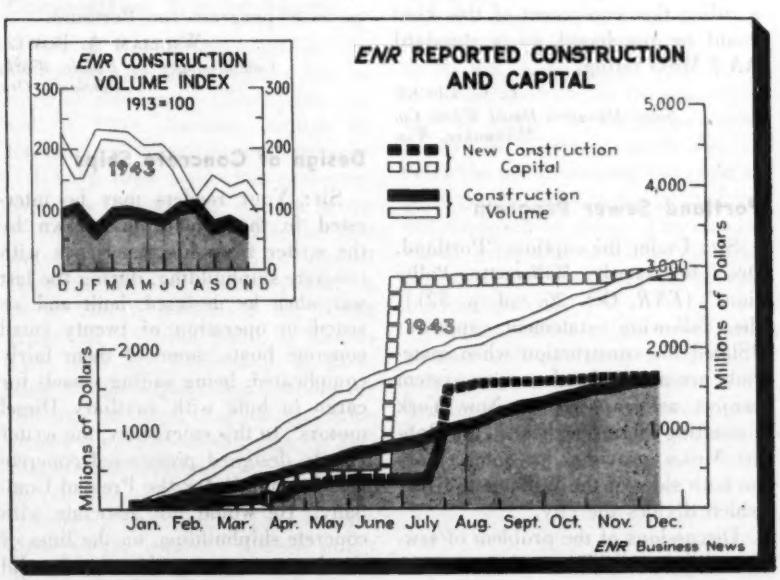
Note: Minimum size projects included are: Waterworks and waterways projects, $15,000; other public works, $25,000; industrial buildings, $40,000; other buildings, $150,000.

NEW PRODUCTIVE CAPITAL

	Cumulative 1943 50 weeks	1944 50 weeks
NON-FEDERAL	$314,630	$427,974
Corp. Securities	22,228	107,220
State & Mun.	126,224	175,814
RFC Loans	15,045	61,940
FPHA Loans	3,133	.....
REA Loans	20,000	20,000
Fed.-Aid Hwy.	128,000	63,000
FEDERAL	$2,753,838	$1,263,800
TOTAL CAPITAL	$3,068,468	$1,691,774

ENR INDEX NUMBERS

Index base=100		1913	1926
Construction Cost	Dec. '44	302.30	145.32
Building Cost	Dec. '44	236.51	127.85
Volume	Nov. '44	74	33


ENR CONSTRUCTION VOLUME INDEX
1913=100
1943
D J F M A M J J A S O N D
ENR REPORTED CONSTRUCTION AND CAPITAL
New Construction Capital
Construction Volume
1943
Millions of Dollars
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.
ENR Business News

Comment and Discussion

Readers' opinions on matters that concern engineers and contractors

Light-gage Steel Specification

Sir: In reporting Mr. Milton Male's paper delivered at the annual convention of the American Institute of Steel Construction, (*ENR*, Nov. 9, 1944, p. 599) reference is made to an as yet unpublished design specification for light-gage steel.

Formulation of this specification is under the sponsorship of the American Iron and Steel Institute rather than the American Institute of Steel Construction as reported.

The two standard specifications for the material, also accredited to the American Institute of Steel Construction, may be identified as the American Society for Testing Materials' serial designation A245-42T and A246-42T.

T. R. HIGGINS
Director of Engineering
American Institute of Steel Construction
New York, N. Y.

How to Buy a Transit

Sir: Frequently contractors and builders who see our advertisement in your magazine ask us to tell them when and how they can purchase a level or a transit. The War Production Board several months ago passed a ruling that equipment of this kind could be purchased on a standard AA-2 MRO rating.

E. G. LUCKE
Sales Manager, David White Co.
Milwaukee, Wis.

Portland Sewer Program

Sir: Under the caption, "Portland, Ore., to remedy Willamette Pollution," (*ENR*, Oct. 26, vol. p. 521), the following statement appears: "Slated for construction when materials are available, the sewer system project as proposed by New York consulting engineers headed by Robert Moses provides for interceptors on both sides of the Willamette River which divides the city."

Discussions of the problem of sewage disposal in Portland have been under way for the past thirty years. The first plans for such a project were proposed in 1933. In the same year, the late Mr. Harrison P. Eddy was retained as consultant and following his report, Messrs. Cunningham, Koon and Dieck, local consulting engineers, were retained for additional studies. In line with these reports, further studies were carried on in the City Engineer's office by Mr. C. H. Smith, Sewer Engineer. In 1939, the City convened a Board of Review made up of the following consulting engineers: R. H. Corey of Portland, Wellington Donaldson of New York, Carl E. Green of Portland and Abel Wolman of Baltimore. In August of 1939, the Board submitted its report recommending methods of collection and treatment of sewage and discharge of effluent into the Columbia River. The report included estimates of construction cost and of operation, maintenance and fixed charges.

These reports were made available to Mr. Moses and his consultants and it was on this data submitted by the Board of Review that the Moses Report recommended the construction of the sewage disposal and treatment system as a part of the postwar program for Portland.

WILLIAM A. BOWES,
Commissioner of Public Works
Portland, Ore.

Design of Concrete Ships

Sir: Your readers may be interested in the conclusions drawn by the writer from his experience with concrete shipbuilding, during the last war when he designed, built and assisted in operation of twenty small concrete boats, some of them fairly complicated, being sailing vessels for cargo in bulk with auxiliary Diesel motors. In this emergency, the writer merely designed prestressed concrete vessels, mainly for the Preload Company. He would not associate with concrete shipbuilding, on the lines of the last emergency, because he did not think such boats could be more than crude substitutes bound to disappear with the first easing of the emergency. These conclusions are the following:

No progress in concrete shipbuilding can be made if the boats have to be classified in the normal way. It is well nigh impossible to do an efficient pioneering job and to have the classification company, going only by experience, endorse the ingenuity of the designer (if any) by a certificate. It is unfair to expect them to. Concrete ships being implements of war, most likely disappearing with it, should not be treated differently as to design than submarines, bombers or, say, transport planes.

The shape of concrete boats should be in keeping with the properties of this material which is more resistant against compression than against bending. Square midship sections with plenty of beams, representing the translation of factory floors to naval architecture, cannot lead to efficient vessels. Membrane structures, possibly combined with prestressing, should be very effective.

When using conventional reinforcement leading to cracking of the concrete, the permissible stress should take into account the percentage of reinforcement as well. No useful purpose is served by placing so much steel in a narrow web that there is no room left for the concrete. The fear of cracks is in many instances very much exaggerated. In statically indetermined structures of concrete, there is bound to be a moment redistribution between critical and less affected sections, which may reduce stresses considerably.

If the fear of cracks cannot be appeased by laboratory tests, to determine the limit of bearable crack widths, prestressed reinforcement, either by itself or combined with conventional reinforcement, should be used. This sounds very complicated in a monolith boat, but is not if precast units are joined together.

The most important factor in concrete shipbuilding is the method of erection. Experience has proved that the pouring of narrow webs, interrupted by beams, between forms with a maze of steel intervening, is an industrially inefficient, slow and costly process, whatever the ingenuity of the contractor and the skill of the mechanics.

Steel shipbuilding has progressed immensely in this emergency by constructing big sections simultaneously and assembling them. Applying this system to concrete, the sections would be smaller on account of weight; the joints could be prestressed. Prestressed concrete has proved not to be sensitive to vibration and alternation of stresses. Whatever the method of joining, since pipes under thousand foot waterhead have been joined successfully, why not precast units under a pressure not exceeding thirty feet.

Navigability of concrete ships should receive more attention, especially small units which are hard to maneuver, and convey the impression to the passenger, of sailing on a stone with a hole in it. Big boats are much more favorable in this respect. When the writer visited the pioneer American vessel, "Faith", in Savona, Italy, in 1921, after arriving from England with a cargo of coal, the crew were very happy about the maneuverability of the ship.

L. COFF
Consulting Engineer
New York

Also Wants to be Heard

Sir: Reference is made to the letter of Harold M. Gould, published on page 61 of the Nov. 2, issue of the "*Engineering News Record*" entitled "Engineers Should be Heard".

Me too.

JOHN GIRAND,
Consulting Engineer,
Phoenix, Ariz.

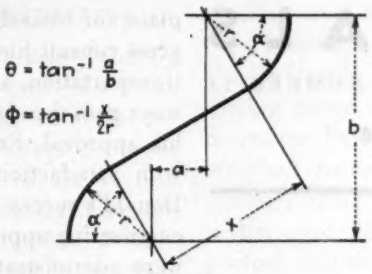
Pipe Bend Formula

Sir: In my article, "Simple Formulas for Pipe Bends," (*ENR* Sept. 21, vol. p. 372) there is a typograpical error in Case I, formula (a). It should read $L = \sqrt{y^2 + X^2 - 4RX}$

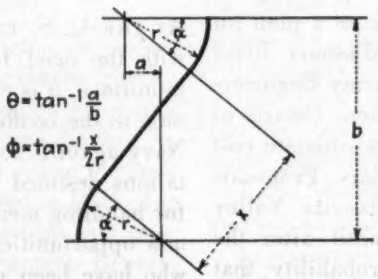
The correct formula appears in other parts of the text but, being a fundamental formula, I believe a correction should be made.

PETER J. MASCARO,
Power Piping Division,
Blaw-Knox Co., Pittsburgh.

Sir: Referring to the article, "Simple Formulas for Pipe Bends," by Peter J. Mascaro, I wish to advise that a solution to the same problem shown



Case No. 1



Case No. 2

$x = \sqrt{b^2 + a^2 - 4r^2}$ for both cases

$\alpha = \theta + \Phi$ Case No. 1

$\alpha = 90° - (\theta + \Phi)$ Case No. 2

on the accompanying drawing has been worked out in our office. This method has been used for a year or more and I believe it is in a slightly more usable form than the one published.

J. F. MALLOY
Construction Engineering Department
Carbide & Carbon Chemicals Corp.
Charleston, W. Va.

Conventional Bracing Faulty

Sir: I was disappointed in Mr. Weitzman's article, "Bracing for Industrial Buildings" (*ENR*, Nov. 16, vol. p. 627), because, though interesting, it contained nothing new.

I have been somewhat concerned over this subject ever since a group of fellow engineers and I found that we could vibrate, with 2 x 4 applied between the expansion joints, a whole 550-ft. section of the North American Aviation plant in Kansas City, back and forth about an inch, after all the conventional bracing for the structure had been riveted. One reason for this probably was the fact that systems designed for tension only do not make satisfactory bracing for compression members. They become slack as the columns shorten under stress. We also observed that due to temperature change the opposite diagonals in the end bays of this bracing system changed from tension to compression within the period of only a few hours during a severe cold shower. Conventional practice has resulted in many faulty bracing systems in this respect, and Mr. Weitzman's design is no exception.

The usual practice of locating bracing in the opposite end bays of a building is to be condemned, regardless of the advantages in plumbing the first few end columns during erection. The normal temperature stresses in such bracing, in any sizable building, are usually so severe during the construction period as to cause the bracing in the end bays to buckle and fail.

In some cases these temperature stresses actually buckle the columns too, or pull through the bottom chords of roof trusses over hangar building doorways, and the like. This problem becomes of increasing importance with the adoption of rigid, welded connections in our modern designs.

The answer lies in the elimination of diagonal bracing systems which extend to the ground in remote parts of the structure, in favor of using stiff bracing systems concentrated near the center of temperature movements, as is done in viaduct construction. The reason for this is that temperature bending stresses occur in the outer columns, especially in the fall and spring seasons before the buildings are fully heated.

At night the temperature drops to near 32 deg., and in the daytime the superstructure will be as warm as 80 or 90 deg. in the shade. This change in temperature causes the superstructure to change in length something like 1½ in. in 300 ft. every day, between the two braced end bays that are both rigidly fixed to the ground and not supposed to move. The result is elastic deformations within the structure itself and in the bracing between the fixed points.

The magnitude of the temperature stresses will be found to be in the neighborhood of 30,000 psi. in the bracing members of structures similar to that proposed by Mr. Weitzman. Temperature stresses alone, in many cases, exceed the yield point.

NED L. ASHTON
Dept. of Civil Engineering
State University of Iowa
Iowa City, Iowa

EDITORIALS

VOLUME 133 NUMBER 24

December 14, 1944

Development of the Missouri

THE RIVERS AND HARBORS BILL which is expected to be passed by Congress as this issue goes to press contains $400,000,000 to start work on a plan for coordinated development of the Missouri River basin that has been evolved by the Army Engineers and the U. S. Bureau of Reclamation. Details of that plan are given in this issue. Its ultimate cost is estimated at over one billion dollars. Proposals to have the work done by a Missouri Valley Authority have been sidetracked until after the new Congress convenes, but the probability that legislation creating an MVA will be passed appears remote. Regardless of what agency or agencies do the work, the program is one calling for a high order of engineering skill if the anticipated returns are to be realized. Also, a great amount of administrative skill will be needed by those who must determine how and by whom the waters are to be used. Here is a problem that can be tackled at once since construction must wait until the demands of war are less imperative.

Honor for a Public Servant

TWENTY-FIVE YEARS AGO, Thomas H. MacDonald, state highway engineer in Iowa, was chosen to head a youthful federal agency that has since become the Public Roads Administration. He had already made a name for himself in the new concept of building roads to meet the needs of motor vehicles. That he was chosen for his ability rather than for his political affiliations is apparent in the fact that his party affiliations were the opposite from those of the Secretary who appointed him. In the 25 years that have elapsed since that appointment was made, Mr. MacDonald has given the nation cause to join with the American Association of State Highway Officials in honoring him (*ENR*, Dec. 7, Vol. p. 716). He could have built the roads bureau into a powerful federal agency that by now would be dictating all road policy down to the smallest detail. Instead, the state highway departments have been given a great amount of latitude in designing and building roads to meet local needs and conditions. And in Washington Mr. MacDonald has made a place for himself that is unique. Members of Congress consult him on all matters affecting highway transportation, and little legislation affecting highways goes through Congress that does not meet with his approval. Engineers, generally, may well note with satisfaction that one reason for Mr. MacDonald's success lies in the fact that he brought an engineering approach to problems that in large part were administrative rather than technical.

Far From Over

AS THE U. S. ENTERS the fourth year of the war with the need for more and more supplies and munitions, it is evident that the role of construction men in the conflict is increasing. For example, the Navy again is seeking officers for construction battalions destined to build and operate installations for handling men and supplies in the Pacific. Thus new opportunities are offered to physically fit men who have been released from war construction in this country or who can be spared from some of the less essential production lines. For those who cannot participate directly there is the immediate opportunity to help put across the 6th War Loan as well as the continuing necessity to further by every means the efforts of the men who are fighting or making the munitions and supplies. There are many more months of hard work ahead, hence the passing of the third anniversary of the attack on Pearl Harbor might well be made the occasion for a stronger resolve to make winning the war our first job.

Salvaging Steel Piece by Piece

REMOVAL OF WHAT WAS LEFT of the Tacoma Narrows Bridge after the collapse added to the limited information available on operations of this sort. If care is taken to preserve data as other steel structures of various sorts are dismantled there will be accumulated useful information on technique in such work. On a recent ship salvage job, described in this issue, the most economical method proved to be taking the structure apart in small pieces, thus following the general scheme used on the Tacoma bridge. Perhaps the piece-by-piece method is preferred because the more spectacular methods requiring the use of explosives usually involve losing control of the operation for a short time, during which those in charge can only hope and pray. During wartime, salvage rather than destruction is in order because it conserves critical materials that makes this method worth while even if the return in dollars is not large.

Drinking Water Standard Controversy

FROM A PROFESSIONAL viewpoint, a very unhappy situation has developed over the past two years in regard to the revised federal standard for drinking water quality. Officially adopted by the U. S. Public Health Service in 1942, the revised standard has since been subject to strong criticism, principally by the American Water Works Association. The controversy threatens the harmonious relations that have long existed between the Public Health Service on one side and state and municipal waterworks agencies of the other.

In brief, the background highlights are these: The Surgeon General of the Public Health Service in 1941 appointed an advisory committee representing all of the national societies having an interest in public water supplies to aid in the revision of a standard previously adopted in 1925. The A.W.W.A. was officially represented on this committee. In December, 1942, the Surgeon General formally promulgated the revised standard, which bore the advisory committee's stamp of approval. In January, 1944, the Board of Directors of the A.W.W.A. passed a resolution calling for modification of certain sections of the revised standard. Following a conference between the Public Health Service and representatives of the A.W.W.A., the Surgeon General issued an "interpretation" of the standard, which is said by the A.W.W.A. to clarify certain points at issue, but which still does not satisfy major differences of opinion.

Without presuming to discuss the merits of the technical issues involved, but looking at the matter from a purely professional and public relations viewpoint, several questions may be raised. First, it would appear that the A.W.W.A. should have stated its objections before the standard was formally adopted. Not only was this group directly represented on the advisory committee, but in addition all but one of the representatives of the other seven national associations on the committee were also members of the A.W.W.A. This committee, in its report to the Surgeon General, said that "after thorough consideration, the advisory committee recommends the adoption of the revisions as set forth . . ." Taken at face value, this statement would imply complete approval of the standard.

Such complete harmony of ideas actually did not prevail, for it was later revealed that some members of the advisory committee had made certain concessions and compromises, the validity of which they questioned. Thus it might appear that the Public Health Service had been overzealous in promoting hasty adoption of the standard. Furthermore, the Public Health Service in publishing the standard included with it a "Manual of Recommended Water Sanitation Practice". This was a matter over which the advisory committee had no control, and the addition of the manual as a physical part of the published standard has met with vigorous objection because of the implication that the subject matter of this manual is a statement of mandatory practice. In one instance, at least, this criticism has already proven to be founded on fact —federal war agencies have adopted the standard and they now require a signed statement from water purveyors calling for compliance with not only the standard but with the provisions of the manual of practice as well.

As circumstances now exist, it would be an understatement to say that the situation is an unfortunate one. The Public Health Service, having adopted the standard in good faith, is under the moral and legal obligation to defend it; and the A.W.W.A., despite an apparent lack of aggressiveness prior to the adoption of the standard, seeks correction of what it believes to be unreasonable demands upon management, operating and regulatory groups engaged in water supply activities. Thus, matters that are best adjusted on the basis of professional deliberations have become topics for debate during which there is always the danger that emotions rather than reason may hold sway.

The Public Health Service, of course, has ample legal authority to issue standards relating to interstate water supplies without taking counsel from any individual, group or association. However, in its relations with state and municipal waterworks authorities it has operated with a fine regard for their views and sensibilities in the solution of mutual water supply and sanitation problems. Present circumstances endanger this constructive relationship as well as the attainment of the very objective sought by the promulgation of a sound and workable national standard. How the compromise can be made is not for us to say, but broadminded and able leaders in both the Public Health Service and the A.W.W.A. should not tolerate further delay in finding the means for sympathetic agreement both on real and fancied grievances.

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U. S. Army Engineer photos

Fig. 1. New concrete overlays placed on existing concrete runways at a Kentucky airfield to carry heavy aircraft loads.

Concrete Overlays for Airfield Runways

Contents in Brief—*Concrete runways for a recently built C.A.A. airfield are strengthened to carry heavy aircraft by superimposing reinforced concrete overlays on the original pavement, with an intervening ½-in. asphalt cushion to prevent bond. Airfield expansion includes new runways of heavy concrete slabs on macadam base. An adjoining modification center also was expanded to accommodate increased plane production. This work included enlargement of a timber-framed building and a new steel-framed hangar.*

WHEN THE INCREASED TEMPO of aircraft construction for military needs necessitated the enlargement of a modification center in Kenutcky, it was all too apparent that the adjoining airfield required considerable expansion to handle the increased traffic. Existing concrete runways, designed for medium aircraft and built in 1942, needed strengthening to carry the heavier loads.

New concrete runways

New runways had to be constructed and some existing ones needed lengthening. Completion of this improvement work in the short space of time allotted, and without interrupting the continuous operation of the field stands as a tribute to the resourcefulness and foresightedness of the Corps of Engineers, the constructors and civilian employees engaged in the work.

New construction included one 5,000x150-ft. runway; two 800-ft. extensions to existing 150-ft. wide runways; widening a 5,000 ft. x 50 ft. taxiway to 100 ft.; several hundred feet of new taxiways and some new turning areas. All new construction was designed to support a 37,000 lb. wheel load. A 4-in. thick dry-bound macadam base supports the new concrete pavement.

On new construction, the supporting soil was scarified deep enough to provide 9 in. of subgrade compacted to at least 95 percent of maximum density at optimum moisture content. Field bearing tests were correlated with laboratory tests to insure adequate supporting strength of the subgrade under saturated conditions.

After the subgrade was properly compacted it was covered with 50 lb. of limestone screenings per square yard to prevent the pumping of mud and silt up into the macadam. The dry-bound macadam then was placed and rolled with a 10-ton roller until well keyed together. Limestone screenings were applied to completely fill all interstices.

New pavement was placed in alternate 25-ft. lanes, keyed together and reinforced with steel reinforcing bar dowels at construction and expansion joints. Dummy joints were placed along the centerline of each 25-ft lane to control any future cracking under traffic.

New concrete runways were poured to a thickness of 10:7::7:10, and taxiways and turning ways to 12:8:: 8:12, as shown in Fig. 3. All had a finished surface sloping on a 1 percent grade to gutter drains in rock-filled trenches at the edge of runways.

Concrete overlay pavement

No exact design methods were available for determining the thickness of concrete overlay required to carry a 37,000-lb. wheel load, since much depended on the supporting power of the original subgrade. It was decided, however, to use a 6-in. overlay on the old concrete runways and a 7-in. overlay on the taxiways and turning areas. Originally, these

pavements had been built to a 9:6::6:9 thickness as shown in Fig. 3. They were estimated to be good for a 15,000-lb. wheel load. After eight months under severe air traffic, these strengthened runways show no signs of weakness.

Asphalt prevents bonding

A one-half inch layer of hot-mix asphaltic concrete acts as a cushion and prevents bonding between the new concrete overlay and the original pavement. Following the cleaning of the old concrete by mechanical brooms, it was coated with a prime coat of hot tar, then the asphaltic concrete was placed and rolled ready to receive the new concrete.

All overlay slabs were reinforced with a welded wire fabric weighing at least 44 lb. per 100 sq. ft. They were constructed in 25-ft. lanes, in much the same manner as were the new runways, except that holes had to be drilled through the old pavement to receive the anchor rods for the steel side forms.

Speed was the keynote of construction on this $1,000,000 airport expansion and improvement project. Work got under way on June 8, 1943, with the start of grading operations. The first concrete was poured on June 26 and the last runway was completed on Aug. 20.

During this 2-month interval the following amounts of concrete pavement were laid: 114,000 sq. yd. of 6-in. overlay; 40,000 sq. yd. of 7-in. overlay; 107,000 sq. yd. of new runway pavement of 10:7::7:10 thickness on the 4-in. macadam base; and 106,000 sq. yd. of 12:8::8:12 taxiway and turning area pavement, also on a macadam base. In general, the concrete was cured with a membraneous coating. Construction reports disclose that 5,500 sq. yd. of overlay pavement were placed in one day, using one 27E and two 34E dual drum concrete pavers.

Two special problems

Two bothersome construction details were connected with the new work of pavement strengthening. One was the removal of existing grate inlets in the old pavement and reinstalling them in the new concrete overlay. The other was making the transition between top surfaces finish at the junctions of the 6 in. and 7-in. concrete overlays.

Fig. 2. Old concrete runways (foreground) were brushed clean, primed with hot tar (center) and coated with asphaltic concrete (background) before placing the concrete overlays.

Another important feature of the construction program was that of maintaining sufficient length of open runway for the air traffic. During the normal progress of the work the effective lengths of the main runways were shortened some 500 ft. due to their being crossed with a newly laid section of thicker pavement or by installation of some overlay slab. In order to furnish an equivalent length of unobstructed runway they were temporarily extended by placing portable pierced-plank steel runway sections at their free end. This procedure was very efficient in maintaining normal flight operations on the field.

The question of drainage lines was no minor item on this project. In

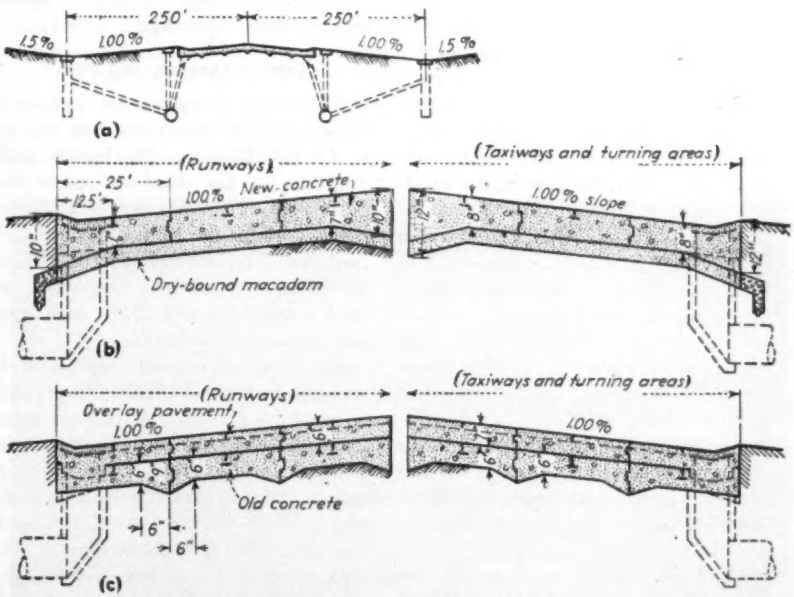


Fig. 3. Runway shoulders slope to collector drains (a), new pavement has a dry-bound macadam base (b), and existing pavement (c) is overlaid with new concrete pavement. This figure is not drawn to scale. This diagrammatic form was used to show the various pavement thicknesses more clearly.

Fig. 5. Portable pierced-plank steel runways serve as emergency extensions during remodeling of existing runways to provide 24-hr. service for large aircraft.

addition to installing side drains for new runways, new collector lines were required for the overall area to be drained.

MODIFICATION CENTER EXPANSION

Expansion of the existing modification building adjacent to the airfield into a modern structure equipped to modify huge quantities of aircraft bound for the fighting front is worthy of note considering its size and the speed with which it was constructed.

The original building, built in 1942, employed timber construction throughout. It has one main aisle 120 ft. wide by 500 ft. long with a 20-ft. wide 2-story lean-to on each side. The new work included a 100-ft. extension to this building, using timber roof trusses and other construction similar to that in the existing building. Other new work included a 600x100-ft. steel frame hangar and one 2-story lean-to, 600 ft. long by 75 ft. wide, built adjacent to one of the old lean-tos.

Construction of the new building was started on May 17, 1943. It was ready for beneficial use by early fall and completed on Dec. 31. Considerable production of airplane modification got under way when the hangar was only partially completed and continued throughout erection of the building.

Although operational needs required the new building to be joined to the old structure, existing exterior columns would have required extensive underpinning to safely support the outside wall of the new lean-to. Furthermore, it would have delayed the construction considerably. Consequently, the lean-to has an independent exterior wall located 5 ft. from the old lean-to. The intervening 5-ft. space was sealed off as dead-space, with connecting openings conveniently located in the two walls. Automatic-closing, fireproof doors protect these openings.

Lean-to concrete and steel

Fireproof construction prevails throughout the new lean-to as well as in the new hangar. The lean-to wall adjacent to the dead-air space between the two buildings is concrete block. Both the second floor and roof are of reinforced concrete, beam and slab construction, supported on steel columns spaced 25 ft. each way and encased in concrete.

An existing concrete apron slab was left in place to form the ground floor of the lean-to. At column locations, however, it was necessary to remove 6x6-ft. sections of the old slab in order to place the column footings. These were replaced with new concrete. Reinforced concrete footings were designed for a 5,000 lb. per sq. ft. foundation pressure and a 24,000 psi. design stress was used for all reinforcing steel.

The first floor of the lean-to houses small metal working equipment used in the modification of planes. It also is used for storage of small parts. The second floor is partitioned into offices for the operating personnel.

Steel-frame hangar

Construction of the new 600x160-ft. steel frame hanager is quite similar to that used in the 4-hangar airplane modification center completed recently in Oklahoma (*ENR* Mar. 9, 1944, p. 332). The 160-ft. span steel roof trusses arrived at the site in four sections. They were riveted complete on the ground and erected in place by traveling cranes using a 4-point pickup. Bottom of trusses are 35 ft. 6 in. above ground floor level.

The roof is 2-in. tongue-and-groove gypsum plank, coated with hot tar and covered with roofing felt. It is supported on bar joist purlins. Trusses, spaced 25 ft. apart, are supported on steel columns encased in concrete. No expansion is provided at truss ends, instead, they are rigidly anchored to the top of the steel columns and all expansion is taken by the outside line of columns in bending.

One transverse expansion joint extends across the new building at its center cutting it completely in two. Double columns support the walls at this joint while the roof decking expands and contracts on a single supporting roof truss.

The outside wall of the hangar has three continuous concrete wall beams running between columns. One is at ground level, one is at the mid-height of the wall and the third forms the roof parapet. Clear glass windows in wooden "victory" sash frames installed between the wall beams extend the full length of the building. A new concrete floor varying in thickness from 8 in. at the center to 12 in. at the edges was placed in the new hangar.

Heat for the entire modification structure is supplied through overhead steam unit heaters from five 150-hp. high pressure boilers. Hot air also is discharged through floor ducts placed just inside the hangar doors. A new boiler house was built to accommodate the enlarged heating equipment.

Artificial lighting consists of a combination of incandescent and mercury vapor units, suspended at the level of the bottom chords of the roof trusses. A timber catwalk at truss level gives access to pulley cords for

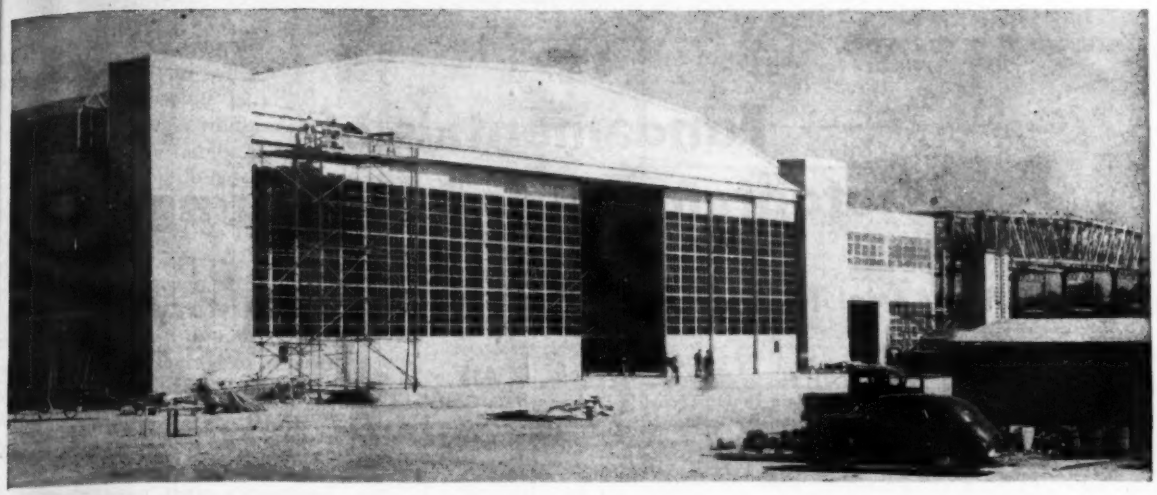


Fig. 6. Steel doors slide into recessed concrete pylons at the corners of the new hangar. Timber roof trusses at the far right are in the extension to the existing timber hangar.

lowering light fixtures to the ground for globe replacement.

The design of the all-timber catwalk is singular in that it utilizes the top handrail as its top chord while its web members function as truss diagonals for the 25-ft. span between trusses.

Overhead sprinklers are provided for the hangars and the lean-tos. An open-head deluge system protects the hangars and a closed-head system is installed in the lean-to structures. Cement asbestos draft-stops ⅝ in. thick and extending the full depth of roof trusses are provided at alternate trusses to retard the spreading of fire by induced draft action.

Outlets for compressed air and electrical service are conveniently located throughout the new hangar. They are recessed in the concrete floor and protected by timber framed covers. The original steel plate covers were discarded as being too heavy for easy removal by women operators of electrical and compressed air equipment.

Sliding doors for hangars

Ten steel-frame doors containing clear glass panels and measuring 16 ft. wide and 35 ft. high provide full openings at each end of the hangar. Doors operate on steel rails set in the concrete floor while the tops are guided by steel channels. Each door section is offset from the adjacent one and they all slide back into concrete pockets formed in concrete pylons at the four corners of the hangar.

Limiting railroad clearances prevented the doors being shipped in one piece. They arrived at the job in three sections each measuring 35 ft. long and 5 ft. 4 in. wide and were assembled by bolting the flanged sections together.

Construction personnel

A contract for all runway construction and runway strengthening was held by the Western Contracting Corp., Sioux City, Iowa. The Gundling Construction Co., Chicago, were contractors for the new modification center. The Link Electric Co., Louisville, held a contract for expanding the contact and runway lighting systems for the enlarged airfield. Expansion of the original sewer system was subcontracted to the Columbia Construction Co., Louisville.

All structures were designed by the U. S. Engineer Office, Louisville. J. Gordon Turnbull and Sverdrup & Parcel, consulting engineers, St. Louis, designed the mechanical equipment and served as consultant.

All construction was under the direct supervision of the Army district engineer, Louisville District, and under Col. C. L. Hall, division engineer, Ohio River Division, Columbus, Ohio. Lt. J. H. Veal was district engineer during construction of the modification center and expansion of the airfield runways. Direct field supervision was by Maj. Harold W. Lieske, area engineer and Lt. L. M. Seavy, assistant area engineer. Current operation of the modification center and adjoining airfield is under the jurisdiction of the U. S. Army Air Corps.

Fig. 7. Light steel trusses of 160-ft. span carry the gypsum plank roof in the new hangar. The floor is an 8-in. concrete slab.

Fundamentals of Photogrammetric Engineering

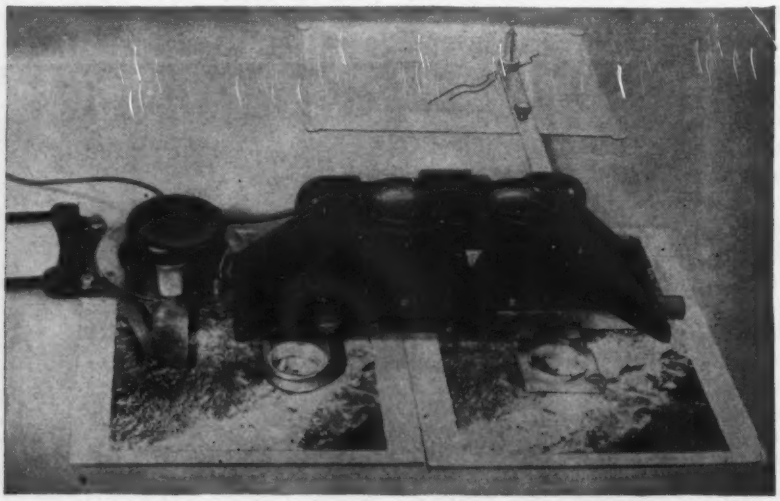
Part II—Aerial Photographs in Topographic and Military Mapping

Reynold E. Ask
Associate Photogrammetric Engineer, U. S. Coast and Geodetic Survey
Washington, D. C.

***Contents in Brief**—In a previous article (Nov. 30, vol. p. 694) the author gave a general introduction to photogrammetric engineering, including geometric characteristics of vertical aerial photographs and the use of these photographs in planimetric mapping. This concluding article considers: (1) Topographic mapping, including the use of various types of plotting equipment and methods such as the sterecomparagraph, the KEK plotter, the Brock process and the multiplex equipment; (2) Military mapping, including the Tri-Metrogon method, the continuous-strip camera, and night photography.*

THE most satisfactory method of compiling a topographic map from aerial photographs is by use of one of the various types of stereoscopic plotting instruments described below. Lacking this special equipment, however, such a map may be constructed by a combination method wherein the planimetry is obtained by running a radial plot as described in the preceding article (*ENR*, Nov. 30, vol. p. 694), the contours being drawn on the photographs by plane-table methods in the field. The plane-table operator can locate by reference to adjacent detail on the photograph many of the points whose elevation he determines. The intersection method must not be used.

The final adjustment of the contours on the photographs is done under a mirror stereoscope, thus making it possible to obtain a good topographic expression. As contours thus obtained represent a perspective view of the terrain, a series of points has to be located by intersection during the radial plot and the contours are adjusted to them. This method is generally limited to mapping comparatively flat or gentle rolling terrain, and methods using stereoscopic plotting instruments are usually to be preferred.



Fairchild Camera and Instrument Corp. photo

Fig. 1. Fairchild stereocomparator set up for use. Note, at the centers of the two glass disks, the "floating marks" which measure elevation by parallax.

Stereocomparator equipment

Several types of plotting instruments based on the stereoscopic principle are available. In order to understand the theory of these instruments the geometric relations must be considered. Referring to Fig. 2, point D on the ground is imaged on photograph 1 at d_1 and on photograph 2 at d_2, The absolute parallax of any point is given by the expression

$$P = X - X' \quad \ldots\ldots\ldots\ldots 3$$

in which X is the distance measured parallel to the air base, from the principal point, C, to the point in question (thus $P_d = X'_d$). The air base, B, is indicated in Fig. 2, and its image on the photograph is $C_1C'_2$ or $C_2C'_1$. The X distance is considered positive when measured from the principal point in the direction of the line of flight. If enough data are given, the absolute parallax of a point can also be computed from the equation

$$P = FB/(H - h) \quad \ldots\ldots\ldots 4$$

in which F is the focal length of the camera, B is the airbase scaled from two photographs and H-h is the height of the airplane above the average elevation of the two photographs. If any other point, E, with images at e_1 and e_2 is considered, its absolute parallax can be measured by

using equation 3 or computed by using equation 4.

Knowing the absolute parallax of both D and E, their difference in parallax, dp, can be found. A simpler method of obtaining dp is to measure with a scale the difference in separation of their images on the photographs, thus $dp = S_d - S_e$. In making parallax measurements it is essential that the air bases of the two photographs lie in a straight line as shown in Fig. 2. This system of measurement can be utilized to determine the elevations of points. By using three or more points of known elevation (vertical control stations) the distances between their corresponding images on the adjusted pair of photographs can be measured, and a graph of measured distance plotted against elevation can be constructed. The curve is almost a straight line. The elevation of an unknown point can then be found by measuring the distance between its corresponding images, entering the graph with this distance, and reading off its elevation. By this method a series of spot heights can be obtained of sufficient density for contour interpolation.

The actual drawing of the contours on the photograph is best done while viewing the overlap area under a stereoscope. Even though no elevations are known, differences in elevation can be determined providing enough data are given to solve equation 4. If one of the photographs is tilted, false parallax values will be obtained. Other sources of error are film and paper distortion, and difference in scale of the two overlapping photographs.

The foregoing describes the operating principles of the stereocomparator type of plotting equipment. A simple instrument of this nature is the stereocomparagraph shown in Fig. 1. Its essential parts are a mirror stereoscope, a measuring device, a pencil tracing arm, and an alignment mechanism (standard drafting machine) for keeping the base of the instrument parallel to the air base on the photographs as the instrument is moved over the overlap area. The measuring device consists of a dot etched on each of two glass disks, whose difference in separation can be accurately measured by means of a micrometer screw reading to 0.01 mm.

After being properly oriented the photographs are viewed through a mirror stereoscope which gives a three-dimensional model of the terrain. When the two dots are over corresponding image points on the pair of photographs, they fuse into a single dot which appears to be touching the ground at that point. If the dots are brought closer together, their fused image appears to rise above the ground—thus the term "floating mark." By means of the micrometer screw a series of readings can be taken on points of known elevation and a graph constructed as previously described. The reading for any contour elevation can now be read from the graph and set on the micrometer screw. The entire instrument (mounted on the drafting machine) is now moved over the stereoscopic model in such a manner that the floating mark appears to be always in contact with the ground, thus following a specific contour. The attached tracing arm draws the corresponding contour line, either on a sheet of drafting material or on a duplicate of the left-hand photograph.

Since the contours thus obtained represent a perspective view of the terrain, some method must be used to get them in true map positions. One way of doing this is to locate by intersection a series of points on a radial plot and adjust the contoured photographs to fit them. In spite of its

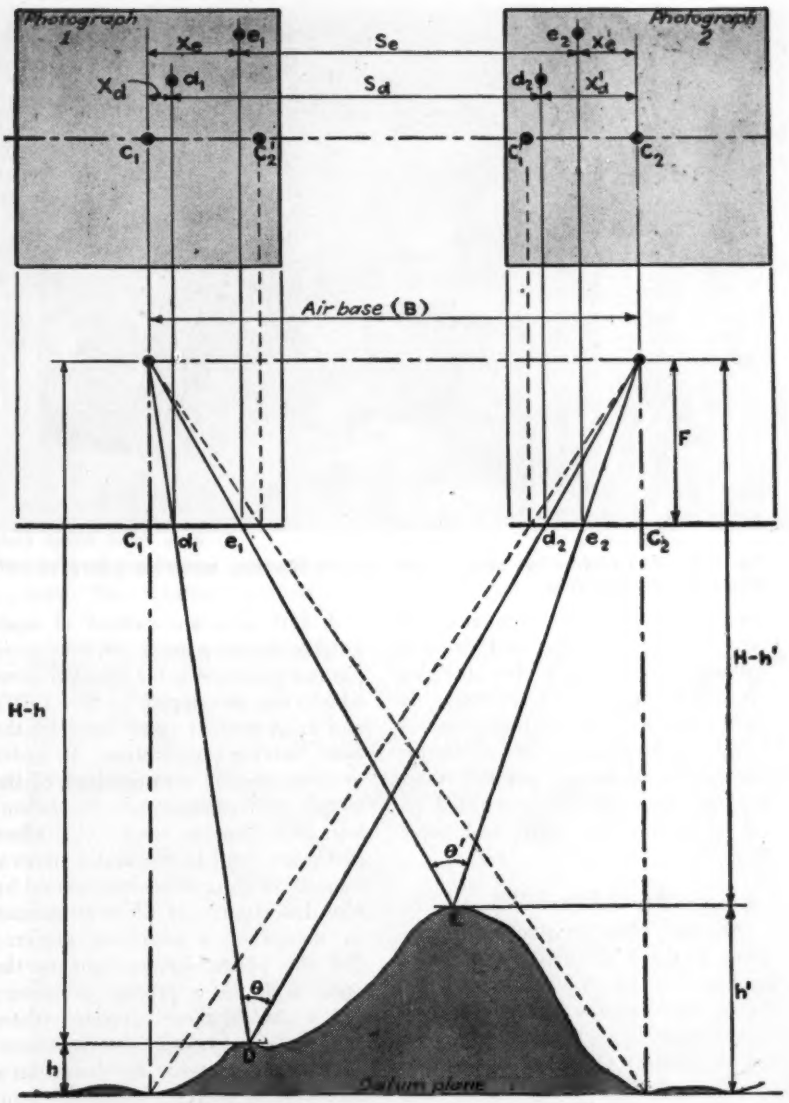
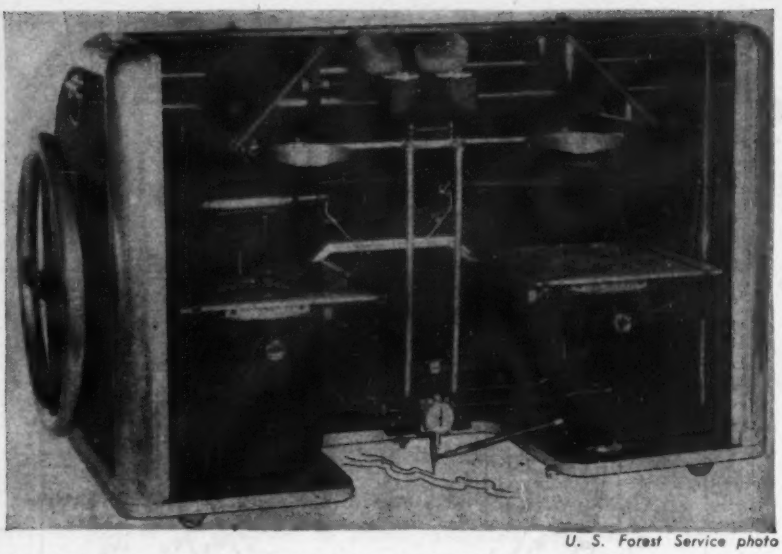


Fig. 2. Plan and elevation views of two successive air exposure stations showing stereoscopic relation.



U. S. Forest Service photo

Fig. 3. The KEK plotter has tilting tables and its "floating marks" are located well above the photographs.

limitations, the stereocomparagraph is one of the simplest and cheapest instruments available for training persons in stereoscopic plotting. In production work its contour accuracy is said to be about 1/500 of the flying height, assuming parallax readings are approximately corrected for tilt, differences in scale, and paper distortion.

Use of KEK plotter

Another portable plotting instrument is the KEK plotter illustrated in Fig. 3. The chief differences between this and the above described stereocomparagraph may be summed up as follows: (1) The photographs are mounted on tilting tables, thus eliminating to a great extent false parallax values caused by tilt of the aerial camera; (2) the floating marks are placed several inches above the photographs instead of resting directly on them; (3) the photographs can be raised and lowered with respect to the floating marks, permitting a scale change to be made for each contour line drawn and thereby bringing all contours to their true map position. The accuracy attained with the KEK plotter is between that of the stereocomparagraph and the miltiplex equipment described below. It is now used chiefly for the compilation of maps on a scale of 1:15,840 or smaller. The instrument has been in use only a short time and further tests may indicate that its range of usefulness may be greater than originally anticipated.

A very accurate method of topographic mapping using the stereocomparator principle is the Brock process which was developed in the 1920's and is at present being used by the Aero Service Corporation. In order to eliminate the shortcomings of the simple stereocomparator, the following procedure is used: (1) Glass plates are used in the aerial camera, thus eliminating difficulties caused by film distortion; (2) tilt is eliminated by means of a rectifying camera; (3) the plates are brought to the same scale in a precise projector; (4) a pair of these corrected plates is then aligned in a precise stereocomparator and contours are drawn on a transparent overlay; (5) the contoured overlay sheet is then placed in a tracing projector where each contour is brought to map scale; (6) the planimetry is compiled by means of a radial plot. The Brock process has been used considerably for the production of relatively large scale maps, such as those having a scale of 1:1,200 and a contour interval of 2 ft.

Multiplex equipment

For accurate topographic mapping the Multiplex equipment (Fig. 4) has proved very successful. It is used for scales ranging from 1:5,000 to 1:25,000. The various steps in the Multiplex method are as follows:

(1) A reduced glass positive (diapositive) is made of each aerial negative in a special reduction printer. The reduction ratio, usually from 1/4 to 1/5, of this printer is set so that the principal distance of the resulting diapositives is equal to the principal distance of the projectors in which they are to be used. The principal distance is defined as the distance from the principal point of a photograph to its perspective center. If the photograph size is the same as the original negative then its principal distance is equal to the focal length of the aerial camera, but if the photograph size is changed by any factor, M, then the principal distance is also changed by the same factor. Thus, when the principal point of a diapositive having a certain principal distance is centered in a projector having the same principal distance, the emergent cone of light rays has the same angular relationships as existed at the aerial camera at the instant of exposure. The positioning of the diapositive to attain this relationship is termed interior orientation.

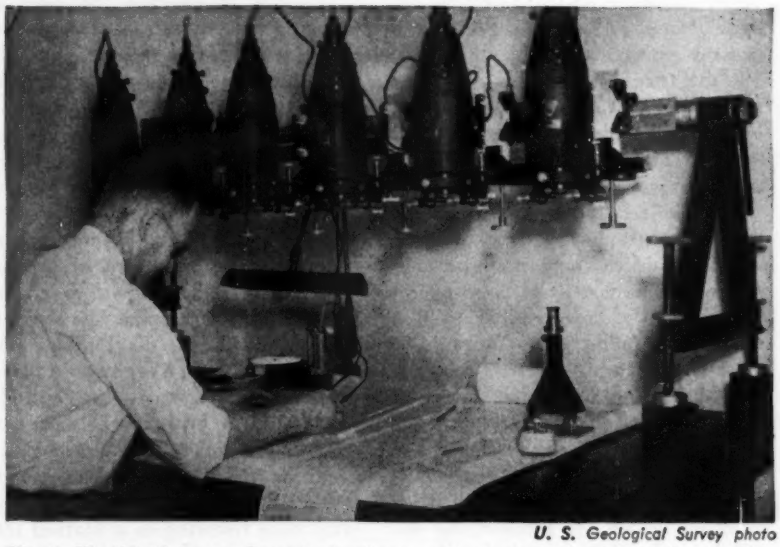
(2) By placing adjacent diapositives of a strip of photographs in adjacent projectors, it is possible to orient them with reference to each other so they have the same relative orientation as the successive positions of the aerial camera at the times of exposure. When this has been done the intersections of all pairs of corresponding rays emanating from two adjacent projectors will form a stereoscopic or special model of the terrain to scale.

(3) In order to make the above spatial model visible, the anaglyphic principle is used. This is a method of stereoscopic viewing in which one image of a stereoscopic pair is projected and viewed in one color and the other in a complementary color. This is done by placing a red filter in front of the light source on the right projector and also over the right eye of the observer, and a blue-green filter on the left projector and left eye. As these filters are complementary in color each eye sees only one image, this of course being a necessary condition for stereoscopic vision. The multiplex operator wearing his anaglyphic spectacles thus sees before him a true scale model of the terrain.

(4) In order to establish a definite scale and to bring the entire model to sea level datum, it is necessary to adjust the projectors, which have already been adjusted relatively, to horizontal and vertical ground con-

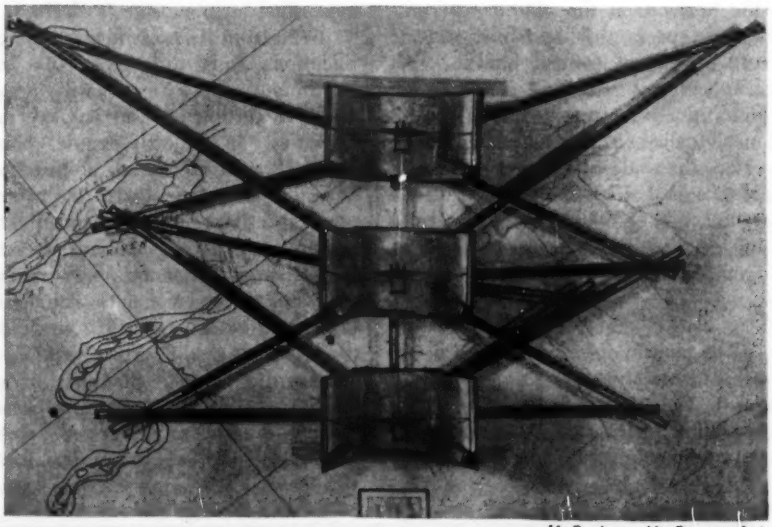
trol. For a bar of six projectors, three horizontal control stations are desired in the first model and two in the last. One vertical control station is desired at each corner of each model. Adjusting the model to fit the ground control is termed absolute orientation.

(5) The actual drawing of the planimetry and contours is done with a tracing table (Fig. 4). This table consists of a stand supporting a horizontal disk which can be raised or lowered, its height being read on a vertical scale. At the center of the disk is an illuminated pinhole or floating mark. By taking readings on vertical control stations it is easy to obtain the scale setting for any desired contour height. With the table clamped at this height the operator merely slides it over the plotting sheet in such a manner that the floating mark always appears to be just touching the ground. A pencil point located vertically below the floating mark draws the contour line on the map sheet. The contour accuracy attained with the multiplex is said to be about 1/1,200 of the flying height. In tracing planimetry such as a road, the operator continually changes the height of the floating mark so that it appears to be touching the road at all times as the tracing table is slid over the sheet. The pencil point, therefore, draws the plan position of the road.



U. S. Geological Survey photo

Fig. 4. The Multiplex equipment showing a unit of six projectors and a tracing table. The "floating mark" is located at the center of the white table disk.



U. S. Army Air Forces photo

Fig. 5. Model illustrating the Tri-Metrogon method with three successive air exposure stations. The vertical and two oblique photographs at each station obtain complete horizon-to-horizon coverage. The metal arms represent direction rays used in radial plotting.

Military mapping

Aerial photographs have two principal uses in connection with military activities—for intelligence purposes and for mapping. The intelligance study is usually made by a stereoscopic examination of pairs of overlapping photographs. Often the same objects are photographed at frequent intervals. A comparative study of these by various specialists on gun emplacements, transportation, industrial plants, etc., often reveals what the enemy is doing or is going to do. The information thus obtained influences current battle plans.

For the long range planning of military operations it is often necessary to construct maps of enemy terrain. Securing suitable mapping photographs for this purpose is a hazardous undertaking. The photographic plane carries several mapping cameras of various focal lengths. With longer focal lengths (20 to 40 in.) large scale photographs for intelligence purposes are obtained, and with the shorter focal lengths (5 to 8 in.) small scale wide-angle mapping photographs are obtained. In order to carry several of these heavy cameras it is usually necessary to strip the plane of its armament. Consequently, photographic planes must rely on their maneuverability and speed to avoid enemy opposition.

The compilation method used for military maps depends on when and for what purpose the map is needed. Radial plot compilations are used when a large scale phanimetric map of a limited area is needed within a few days. The multiplex method is used when an accurate topographic map is needed for future activities, usually several weeks or months hence.

Tri-Metrogon method

For the construction of small scale aeronautical charts the Tri-Metrogon method is employed. Its name is derived from the fact that it uses three cameras each equipped with a wide-

angle Metrogon lens. The tri-camera arrangement is such that the central camera points vertically downward but the two side cameras are tilted outward 60 deg. from the vertical. Thus, the angular field of the entire unit extends from horizon to horizon. The model shown in Fig. 5 illustrates the relative positions of the three photographs.

A planimetric map may be constructed from a strip of these photographs in a manner similar to that used for a radial plot. However, a modification in procedure is required to obtain true horizontal direction rays to points on the oblique photographs. A special device called the rectoblique plotter has been developed for this purpose. Another interesting device for transferring detail from the oblique photographs to the plotting sheet is called the oblique sketchmaster. The inclusion of the horizon on the obliques permits a wide spacing of flight lines and the use of distant control points. Spot heights for controlling contours are determined by means of an instrument called a photo-alidade. Generally the scale of the vertical photographs is 1:40,000, the scale of the radial plot 1:80,000, and the scale of the published aeronautical chart from 1:250,000 to 1:1,000,000.

Continuous-strip camera

The continuous-strip camera is another interesting war time development. Such a camera does not take the usual series of overlapping vertical photographs. Instead it takes one continuous photograph, as long as the entire roll if desired. The operating principle of this camera is a modification of that employed in the focal plane type shutter found on many hand cameras. However, the curtain slit instead of traveling across the focal plane, remains stationary. The film is moved past this slit at a speed which is synchronized, insofar as possible, with the movement of ground images across the field of view. For military use the camera has the following advantages: (1) Photographs can be taken from a high speed plane flying at an extremely low altitude (Fig. 6). An ordinary between-the-lens shutter operating under these conditions would not be fast enough to stop the image movement on the films, thus resulting in a blurred image. (2) A continuous image is obtained, so it is not necessary to paste individual prints together if an uncontrolled strip mosaic is desired.

Aside from its present military applications, it is quite likely that the continuous-strip camera will prove useful in certain postwar engineering activities, particularly route planning. A vertical aerial photograph is a perspective view with the center of perspective at the lens, but a continuous-strip photograph has its center of perspective continually changing. Relief displacements will therefore in all cases be at right angles to the line of flight.

In order to take photographs of enemy installations at night, a special technique has been developed. Flash bombs having delayed action fuses are used. The fuses are set to explode the bomb at a level which allows the plane to travel forward a sufficient distance so that the flash occurs outside the angular field of the camera (Fig. 7). Light from the flash is picked up by a photoelectric cell on the camera, the small current generated by this cell being received by the control unit where it is amplified sufficiently to trip the camera shutter.

Conclusion

Only basic fundamentals and working practices of aerial photogrammetry have been explained in these two articles. But it is hoped that this is sufficient for all engineers to appreciate the usefulness of this art as well as its limitations. For medium and small scale mapping, aerial photogrammetry has advantages over the usual ground methods in its economy, speed, completeness of detail, freedom from large blunders and permanency of record.

Probably the field of aerial photogrammetry will include in the near future the preparation of large scale plans for various engineering uses. Up to now it has been used for such purposes relatively infrequently due to: (1) Image movement on the film at the low flying heights needed to obtain large-scale photographs—this may be overcome in the future by using helicopters; (2) lack of suitable plotting equipment at reasonable cost for compiling maps from such photographs—the tremendous stimulus that the present war has given to

U. S. Army Air Forces photo

Fig. 6. Section of a continuous-strip photograph taken from a plane flying at 250 mph only 200 ft. above ground. Scale as shown is about 100 ft. per in.

photogrammetry may perhaps result in the development of such equipment.

The war has greatly increased educational training in various branches of photogrammetric engineering. Hundreds of persons have received basic training through the Engineering, Science and Management War Training Courses offered by many schools in cooperation with the U. S. Office of Education. The more progressive schools, realizing the importance of photogrammetry and having acquired some training equipment, will probably include the course in their postwar civil engineering curricula. The larger schools may offer several courses in various phases of photogrammetry, augmenting their present equipment with additional instruments which may be available after the war.

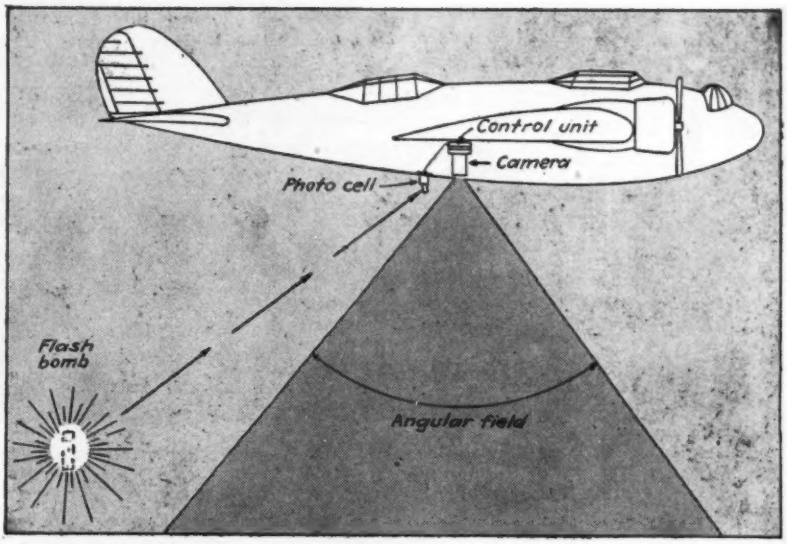


Fig. 7. Flash bomb with delay fuze provides light outside angular field of camera for taking picture at night. Light hitting photo cell trips camera to make exposure.

Elimination of Losses in Water Distribution Systems

A prime responsibility of the waterworks operator is provision of a pure and adequate water supply, efficiently and economically managed. This goal is attainable only if unaccounted-for losses in the distribution system are held to a small percentage of the total flow, according to Dewey Johnson, engineer for the Cast Iron Pipe Research Association.

In a paper presented before a recent meeting of the Illinois Water Plant Operators, Mr. Johnson estimated that the 14,500 public water supplies in this country, serving about 84,500,000 people, were needlessly pumping 4 billion gpd., much of which could be saved. This waste, he said, may easily be costing the country well over $170 million annually for operation alone.

Many water plants are unable to account for 50 percent of their water, some 80 percent, and even the well-managed plants as much as 15 percent. Selling 90 percent of the quantity pumped is a rare achievement. Effingham, Ill., has the distinction of accounting for 92 percent, and the record was made by a California city, which after 15 years of accounting for 95 percent, reached 96 percent last year.

To improve the situation, public opinion must be aroused, leaks in the distribution system located and repaired, and meters of the right type installed and serviced. The aquaphone for service leaks and sewer inspection for broken mains or blown lead joints will locate practically all water losses. For this work, personnel need not be specially trained, as meter readers could check fire hydrants and valves on their routes. A suburb of Chicago recently made such a survey for a labor expense of $30 per thousand people in the area covered.

Meters of the wrong size cause much loss of recordable water usage. For example, a 6-in. type is often used where a 2-in. size would be far more accurate. Inaccuracy of residential meters accounts for further revenue loss, as shown by experience at Elgin, Ill., where a test on 181 meters that had served 26 years indicated that the annual revenue lost with each meter was $3.47.

No large factory or building should have fire protective systems without meters, or without some way of checking unauthorized use of these lines by the plant personnel.

A thorough check of the totalizing meter at the city water plant makes a good starting point for every survey, for this meter often is in error due to lime or other chemical accumulation from the water treatment. Upon installation of the plant meter, it is wise to make provision for cleaning the throat, if of the Venturi type. A bypass should be provided for other types, to ensure accessibility for periodical cleaning and overhauling.

An an example of what can be accomplished in stopping leakage losses, Mr. Johnson mentioned Chicago, where, in an eleven year period, leakage has been stopped in the amount of 206,882,000 gpd. Credit for a large portion of the success in that city's campaign has been assigned to the dye method of leak detection.

This method, developed by the city of Chicago in 1926 and used there since with marked success, was illustrated by Mr. Johnson with the aid of motion pictures. (Editor's Note —The dye method, used where a leak cannot be heard with the aquaphone or where other unfavorable conditions exist, was described in detail in *ENR*, May 28, 1936, p. 768).

Reports on improvements resulting from continual efforts toward stopping leaks and perfecting meter accuracy show that several other Illinois communities are making substantial savings in their water pumping costs. At Glen Ellyn, for example, 84½ percent of all water pumped can be accounted for, whereas 15 years ago, 50 percent of the water was lost.

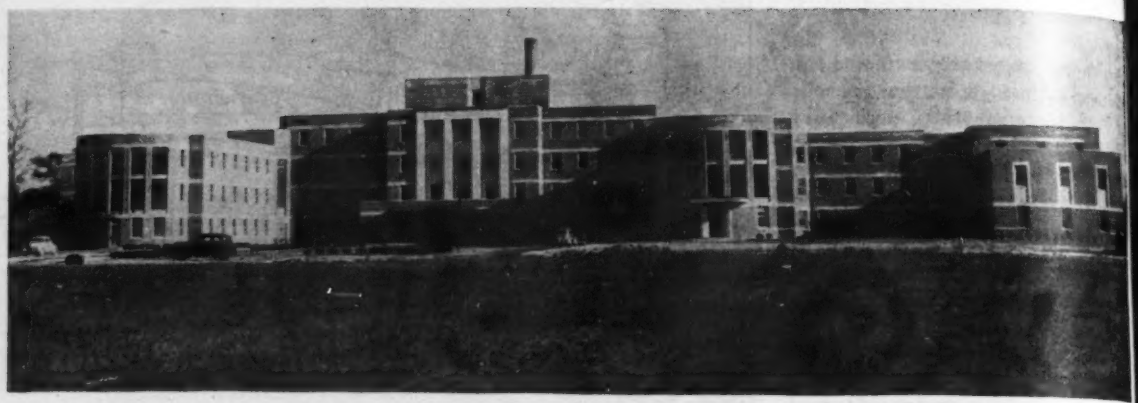


Fig. 1. One of the largest multi-story hospitals built in the East as a war project is this Norfolk hospital providing 300 beds.

Building a Permanent Hospital in Wartime

***Contents in Brief**—In building a four-story permanent hospital at Norfolk, Va., a plan providing several wings and heating facilities, laundry, main kitchen and similar services on the ground floor, was chosen as most satisfactory. Load-bearing brick construction was used for the walls, arch lintels being employed to provide openings in the interior walls. Floors consist of a pre-cast gypsum plank over metal joists, and the roof is of similar construction.*

ONE OF THE LARGEST hospitals built in the eastern part of the United States as part of the war program has recently been completed at Norfolk, Va. Designed as a permanent structure for use after the war, the building, in addition to its size, is distinguished by a plan developed to provide the most efficient service and maximum comfort for patients. The project is further distinguished by the construction procedure followed to overcome the critical materials problem, which was magnified on hospital work because of the numerous special materials required.

Planned for both white and negro patients, the structure is a complete general hospital of 305-bed capacity. In addition to providing classrooms and teaching facilities for training student nurses, the project also includes an adjoining nurses' home accommodating 130 students and staff.

The hospital proper (Fig. 1) is three stories high with a central portion carried to four stories, plus a penthouse; the wings flanking the central portion to the north are but one story high and the east wing two stories. The administrative offices, accident rooms, pediatrics section, X-ray department and all services, such as laundry, heating plant, food preparation, and dining facilities, are located on the ground floor, where negro patients are also accommodated to permit segregation. On the second floor, quarters for internes and residents are provided in the central wing to the north, and the surgical operating suite, complete with its own sterilizing unit, is isolated in the east wing. The rest of this floor is devoted to white private, semi-private and ward patients.

Additional private rooms for medicine and obstetrics are provided on the third floor, with the delivery suite and central sterilizing unit in the central north wing. The nurseries are at the east end of the main building in the section assigned to obstetrical patients.

On the fourth or top floor, much smaller in the area than the others, are located the living quarters for the nuns operating the hospital. Finally, in the penthouse are housed fans and motors for ventilation of the building and elevator machinery.

At the time the main structure was being designed, the shortage of reinforcing steel precluded the use of reinforced-concrete floor framing and indicated that the floor and roof would need to be built of heavy, fire-resisting timber joists covered by gypsum plank. A water table near the surface dictated that no floors be below grade, which is the case with all but a few buildings in the Norfolk area. On the other hand, sufficient land was available to permit construction of a low building spread over a large area.

When construction was about to start, it was found possible to secure the necessary steel, the supply of which had become less critical. As a result, the original timber floor design was abandoned in favor of metal joist construction with some reinforced-concrete girders.

Brick arches save steel

Supported by grade beams that connect the pre-cast concrete foundation piles, the exterior walls are generally 17 in. thick in the ground story and 13 in. in the upper stories. Lintels in the exterior walls are of concrete, except for the exterior 4 in., which is of limestone placed for the most part in continuous horizontal bands. All spandrels are waterproofed. Also load bearing, the interior walls vary in thickness from 22 in. or less on the ground floor to 13 in. in the top story. Openings in these walls are spanned by segmental brick arches to conserve the use of reinforcing steel.

Interior finish of the walls in the rooms, wards, offices, corridors, and nurseries is painted plaster. In the cafeteria, kitchen, serving rooms, laboratories, toilets and utility rooms structural wall units with glazed finish form an integral part of the wall; this finish is limited to the height of the doorways for economy, the common brick above that point being painted. Wall finish in the operating and delivery suites and sterilizing rooms is of ceramic tile.

Acoustical fiber tile is used to finish the ceilings in the corridors, operating and delivery suites, nurseries, kitchen and serving rooms and cafeteria. In the hallways the ceilings are suspended below the floor structure to provide space for exhaust ventilator ducts installed for the toilets, utility rooms, and diet kitchens.

Finished floors, consisting generally of asphalt tile, but with ceramic tile and terrazzo employed in spaces subject to excessive wear or demanding an impervious finish, are in-

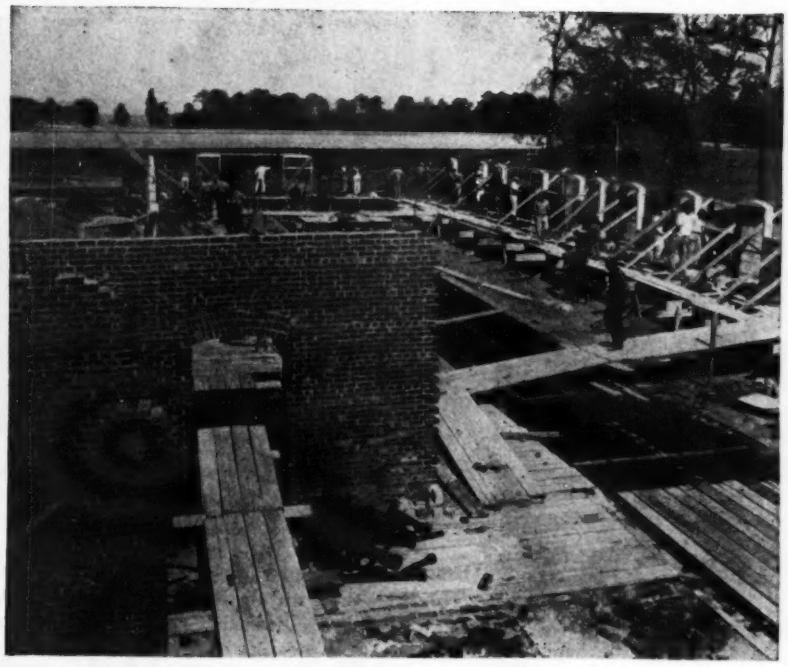


Fig. 2. Brick arches in inside walls take the place of the usual reinforced lintels. Use of metal joists for floor construction may be noted at lower right.

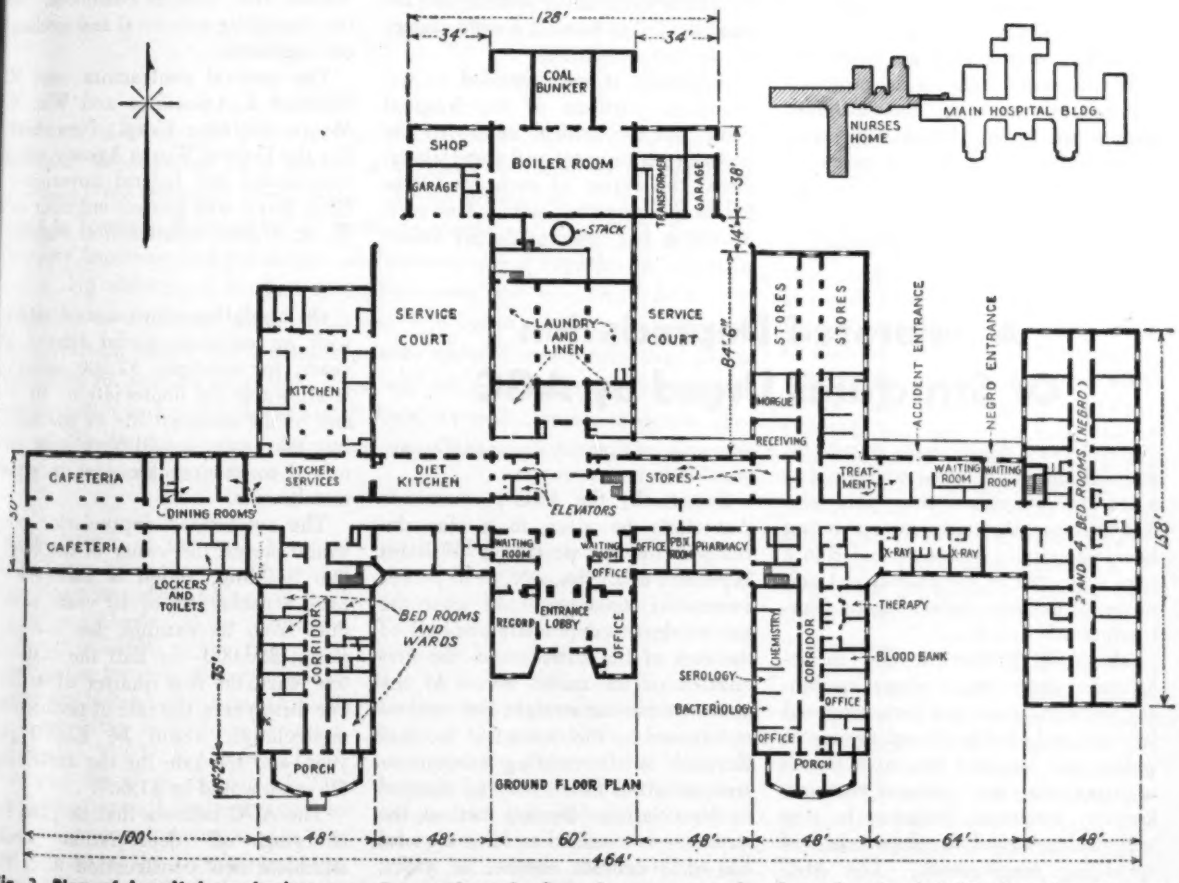


Fig. 3. Plan of hospital emphasizes use of a number of wings to assure ample air and natural light. Location of nurses' home with reference to hospital is indicated by small sketch at upper right.

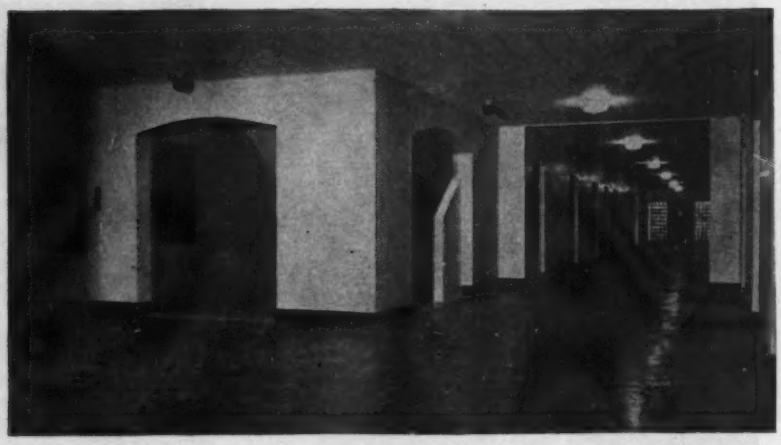


Fig. 4. A typical corridor in the hospital has an asphalt tile floor with ceiling covered with acoustical tile. Note arch openings.

stalled on a 2-in. concrete bed put down on the gypsum plank. Thresholds are tile and slate, as are the window stools. An asphalt tile base is used in conjunction with floors of the same material.

Similar to the floors, the roof construction consists of metal joists covered by gypsum plank, 2 in. of fiber insulation, and a built-up slag roof.

Incandescent lighting is provided throughout most of the hospital, fluorescent tubing being used only where suitable. Power is provided by a transformer bank delivering 220-110 v. from a 4,200-v. supply.

Four heating units are provided in the central plant at the north end of the central wing. These consist of three low-head, coal-fired units for low-pressure steam heating and one high-head, coal-fired unit providing high-pressure steam for the sterilizing kitchen and laundry equipment. The three low-head units provide the desired flexibility to meet a wide variety of weather conditions.

Originally it was intended to air-condition portions of the hospital plant, but the critical nature of the necessary equipment and materials reduced the extent of such conditioning to the operating suite. However, provision has been made for future extension of this facility to other areas.

The nurses' home, accommodating 130 staff and student nurses, is a two-story, L-shaped building joined to the hospital by one-story construction providing an auditorium, recreation rooms and teaching unit. One wing of the "L" is 183 ft. long and the other 134 ft., both wings being 40 ft. wide with a 5-ft. corridor in the center. This construction is similar to the hospital proper, as is the one-story training wing between the hospital and the nurses' home.

The project cost approximately $2,000,000, with almost the entire amount supplied by the federal government, the Society of Saint Vincent de Paul being the sponsor. James R. Edmunds, Jr., Baltimore, Md., represented on the site by Andrew B. Sunter, resident engineer, was the architect with T. David Fitz-Gibbon and Rudolph, Cooke & Van Leeuwen, Inc., of Norfolk, acting as associates for the supervision of construction. Crout, Snyder & Crandall and Henry Adams, Inc., both of Baltimore, were the consulting structural and mechanical engineers.

The general contractors were M. Millimet & Associates and Wm. M. Moore Building Corp., New York. For the Federal Works Agency, which represented the federal government, Blair Boyle was project engineer and W. A. Wilson, construction engineer.

Accelerated Depreciation Of Structures Urged by AGC

Accelerated depreciation of new industrial and commercial structures as a means of stimulating privately-financed construction and spreading business activity is recommended in a plan approved by the Executive Committee of the Associated General Contractors of America.

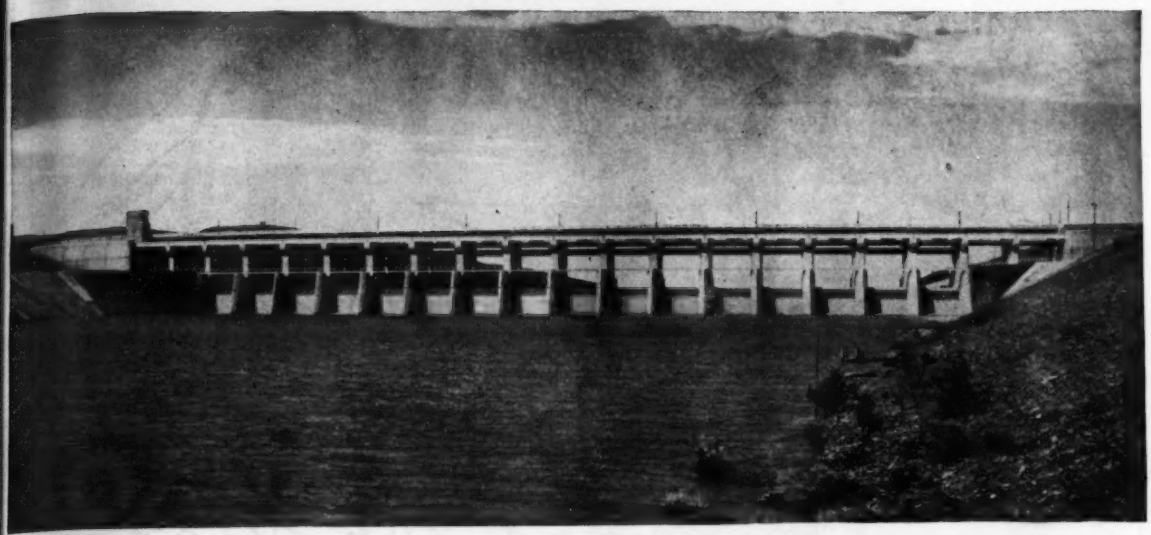
The AGC points out that an accelerated depreciation of new machinery and equipment has been proposed by various individuals and groups in public and business life, as a means of stimulating new business ventures, keeping American industry in step with technological developments and spreading employment. The AGC believes that the economic factors involved in the depreciation of machinery and equipment are equally applicable to new structures.

Specifically the AGC recommends that study be given to a plan developed by its president, William Muirhead of Durham, N. C. to permit owners of structures built after the war to elect to depreciate one-half of the cost of the structure in the first quarter of its useful life. At the present time, the straight line method is followed by the Bureau of Internal Revenue in determining exemptions from taxation which may be charged to depreciation. By this method, the structure is assumed to have a useful life of a definite number of years. Each year a fixed sum is allowable for depreciation.

On a building which costs $100,000 with an assumed useful life of 40 years, for example, $2,500 annually is allowable for depreciation. By the end of the assumed life of the building, the owner would have been permitted to recover the cost in equal installments.

The accelerated depreciation plan would permit the owner of the $100,000 building, which is assumed to have a useful life of 40 years to deduct from its earning, for tax purposes, $50,000—or half the cost—in ten years, the first quarter of its life. For these years, the rate of permissible depreciation would be $5,000 per year, and the rate for the remaining 30 years would be $1,667.

The AGC believes that its plan for charging off depreciation would stimulate new construction after the war, increase employment in construction and other industries.



Spillway control gates at Fort Peck, first great structure built to control the waters of the Missouri River.

Plans for the Missouri River Basin

Harold W. Richardson
Western Editor, Engineering News-Record

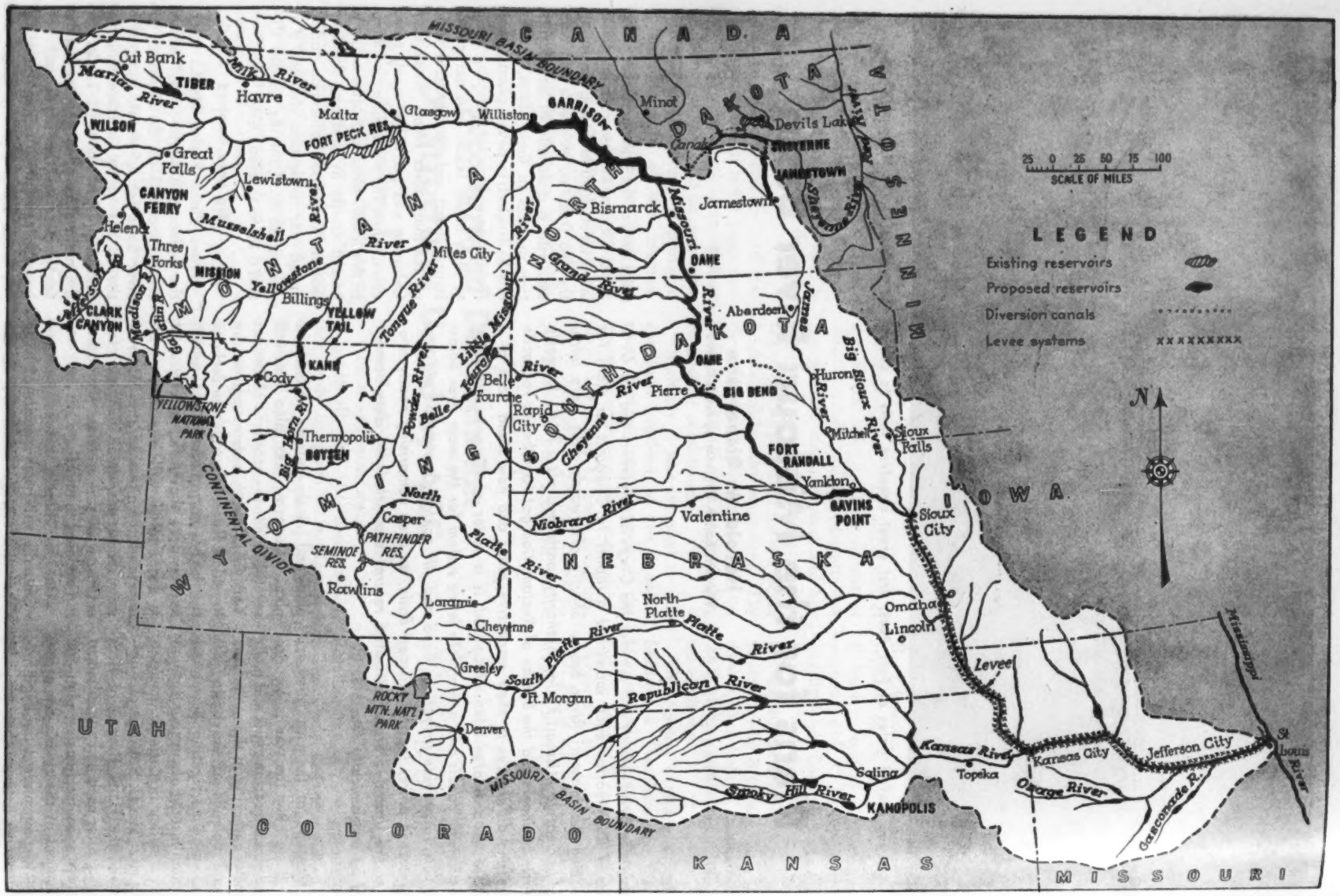
***Contents in Brief**—Early last summer the Corps of Engineers and the U. S. Bureau of Reclamation each submitted a report to Congress on plans for developing the Missouri River Basin. Shortly afterwards, bills were introduced to create a Missouri Valley Authority, patterned after TVA. Recently the Army Engineers and the Bureau of Reclamation got together to reconcile engineering differences in their respective plans and now stand back of a combined, co-ordinated plan. Proposed is a series of 99 new reservoirs, three diversion canals and a complete levee system for the main river below Sioux City to provide irrigation, flood and silt control, navigation aid and hydro-electric power for the Missouri Basin, an area comprising nearly one-fifth of the United States. Estimated returns show that the development would be economically feasible.*

DEVELOPMENT of the vast Missouri River Basin after the war is certain. Some day waters from rains and melting snows gathering in the mountains and arid uplands of the basin will be put to use for irrigation, power and navigation instead of surging through the lower valley in periodic devastating floods. The U. S. Corps of Engineers and the U. S. Bureau of Reclamation, after each had submitted to Congress a comprehensive plan for development of the river's resources, have now compromised the engineering differences between their original plans and jointly endorse a combined plan. Congress has also received several bills to create a Missouri Valley Authority, a step suggested by President Roosevelt, who now declares that he has no preference as to which agency does the work as long as it is done. Meanwhile the nine governors and the press of the Missouri watershed states are all clamoring for action, with preponderance of opinion opposed to an MVA.

Out of these various schemes eventually will come a series of large dams and storage reservoirs on the main stem of the Missouri River above Sioux City, more reservoirs on tributaries throughout Montana, Wyoming, the two Dakotas, Nebraska and Kansas, with a multitude of new irrigation projects in these states, numerous hydroelectric power plants, some furnishing energy for pumping water to high bench lands, and navigation improvement and flood-control work on the main river below Sioux City. Colorado will get a few small reservoirs, while the remaining two states in the basin, Iowa and Missouri, will benefit mostly by upstream flood detention, local flood protection and by an all-year navigation channel, 9 ft. deep from St. Louis to Kansas City and 6 ft. on to Sioux City.

Big area involved

From Three Forks, Mont., where the Jefferson, Gallatin and Madison rivers meet to form the Missouri, the river flows for 2,546 mi. (longest in the U. S.) to its junction with the Mississippi just above St. Louis. As the main stream, in general, follows fairly close to the north and east boundaries of the drainage area, the left bank tributaries are short and



Joint plans of the Corps of Engineers and the U. S. Bureau of Reclamation contemplate 99 new reservoirs for irrigation, flood control, navigation aid and hydro-electric power development in the Missouri River basin, covering one-fifth of the United States. Only

latively small. The most important e the Marias and the Milk River in ontana and the James and the Big oux in South Dakota.

Tributaries from the west are much ore numerous and extensive. Some e major river systems in themselves, e the Yellowstone and Platte, with eir headwaters threading out of the gh Rockies. Other important reams coming into the right bank the Missouri include the Musselell in Montana, the Little Missouri North Dakota, the Grand, Moreau, heyenne and White in South Dakota, e Niobrara in Nebraska, the Kansas Kansas, and the Osage and Gasonade in Missouri.

Nine states in the basin

The Missouri drainage area covers 29,000 sq. mi., or 18 percent of the ontinental United States, extending to nine large western states. This ea now supports a population of 340,000 or 5 percent of the U. S. tal, concentrated in the eastern ird of the watershed. There are ly nine cities having over 25,000 opulation: Kansas City, Mo., Denver, Colo., Omaha, Nebr., Kansas ity, Kans., Lincoln, Nebr., Sioux ity and Council Bluffs, Ia., Sioux alls, So. Dak., and Great Falls, ont., but they account for one-fifth f the inhabitants. In 1939 the alue of crops and livestock produced n the basin was $1,029,000,000 or 13 ercent of the nation's total.

At present there are 100 million cres of grazing land and 90 million cres of tillable land in the basin, f which 5 million acres are under rrigation. The U. S. Bureau of eclamation would double this irriation acreage under its plans for evelopment.

Storage of water for irrigation and s distribution over the land is exected to restore dwindling groundater resources in regions that must epend on pumping for water supply.

Conflicting interests

Administration of any plan adopted or development of the entire basin ould be complex because of the aried interests and conditions inolved. Operation under a proposed Missouri River Valley Authority, for xample, would be far more compliated than is the management of the ennessee Basin under TVA. The ennessee Valley is a homogeneous area in climatic, economic and geographical aspects. That basin is drained by one large river with few tributaries except at the headwaters. The interests of the people are largely the same throughout the valley. Power and navigation are of prime importance, flood control is secondary, and irrigation requirements are non-existant.

In contrast, the character of the main river, the climate, topography and economic interests of the Missouri Valley vary greatly from one end of the basin to the other. Conflicting uses of water are of even more concern. In the vast arid regions in the west and north sections of the watershed, where the annual rainfall is only 10 to 20 in., irrigation is of paramount importance. Here water is the economic life-blood of the people. Here an irrigation ditch carrying a dependable water supply means as much to the community as a transmission line carrying electric power does to an Eastern industrial center. Few persons who have not depended upon irrigation for their very existence can appreciate its value, which makes the water problem of the West difficult for the rest of the nation to understand.

Involved water rights

Distribution and allocation of water in the upper basin is further complicated by prior water rights owned by states, irrigation districts, municipalities and private individuals. In some cases the state rights are incorporated into the state constitutions, which, of course, have been ratified by Congress and are therefore irrevocable. Other state water rights are protected by interstate pacts.

In the lower valley — eastern Nebraska, eastern Kansas, western Iowa and most of Missouri—irrigation is of no concern, for the average rainfall from 30 to 40 in. per year is ample for good agriculture. This end of the watershed is interested only in controlling the floods, in providing ample water for year-round navigation, and, to some extent in power, for much of the basin's industrial development lies in these sections. Except in a few instances, elsewhere in the Missouri Valley the new power that is to be developed will have to be used in large part for irrigation pumping, and for rural electrification systems, leaving only minor amounts for possible new industries.

While these four major water interests—irrigation, flood control, navigation and hydro-electro power— are in conflict, they are not incompatible. It is true, of course, that some of the water diverted to irrigation is lost to lower-river navigation and that water cannot be used to generate power and at the same time be stored for future use. Reservoirs cannot be filled to capacity for irrigation storage and leave room for possible flood detention. Nor can water be released for power generation when the lower river reaches flood stage.

Yet these conflicting interests can be compromised by judicious allocation of water and of storage space. Storage in main reservoirs can be allocated partly to irrigation, and partly to flood control. Release from main-stem reservoirs can be regulated to give a fairly constant flow for power and navigation. It will be a complex operation, but it is entirely possible if priorities and agreements as to water use are determined in advance.

However, it will not be possible to control or regulate the entire runoff from the watershed, for the tributaries are too many, the amount of water involved is too great, and the precipitation is largely concentrated in regions where flood storage cannot be provided at a reasonable cost.

Two plans reconciled

The two original plans submitted concurrently to Congress last summer by the Corps of Engineers and the U. S. Bureau of Reclamation agreed in general concept, but differed in details. Both contemplated a series of big dams and large reservoirs on the main stem above Sioux City, both would develop hydro power, and both would replenish dwindling Devils Lake in North Dakota, though it lies in the Red River drainage area, with Missouri River water carried through a diversion canal across a low divide. Finally, both would utilize the Army-built Fort Peck reservoir, with its 19½ million acre-ft. of storage, to full extent.

The Army proposal (House Document 475, 78th Congress, 2nd Session) was concerned mostly with reservoirs on the main stem in the

two Dakotas, and in navigation development and flood control from Sioux City to the river mouth. It was popularly known as the Pick Plan, for it was developed by Col. Lewis A. Pick, formerly U. S. Division Engineer, Missouri River Division, whose activities have been diverted, temporarily at least, from the basin problems to building the Ledo Road in Burma. Col. Pick confined his control of the upper tributaries to two projects on the Yellowstone and its Big Horn tributary. Congress has already authorized the Army to build dams in the Kansas, Osage, Gasconade and Grand (northern Missouri) valleys. The Pick Plan called for five more reservoirs on the Republican, a tributary of the Kansas.

Much storage proposed

Contemplating main stem storage of somewhat less capacity than did the Army, the Bureau of Reclamation plan (Senate Document 191, 78th Congress, 2nd Session) was far more concerned with projects on the tributaries, including the Kansas, but not on the streams in Missouri. It made no provision for flood-control work and navigation improvements on the lower river. The U.S.B.R. proposed 90 reservoirs against the Army's 22 (including 10 already authorized in the lower valley tributaries), yet the total reservoir storage capacity of the two plans was remarkably close; the Army would store 40,200,000 acre-ft. above Sioux City, the U.S.B.R. reservoirs in the same area total 35,446,000 acre-ft. Additional storage amounting to 10,300,000 acre-ft. was contemplated by the bureau on the Platte, Niobrara and Kansas rivers, giving a total of 45,700,000 acre-ft. for the entire basin, exclusive of Fort Peck. The ten authorized and five proposed projects on the lower tributaries would have brought the Army's total storage close to this figure.

By allocating jurisdiction over functions of the proposed development and dividing the basin into six geographical areas for analysis, a committee representing the Army Engineers and Bureau of Reclamation had little difficulty in compromising the engineering features of the two plans in a two-day conference held at Omaha, Nebr., Oct. 16-17. The result of the meeting was a written agreement, signed by Maj. Gen. Eugene Reybold, Chief of Engineers, and Harry W. Bashore, Commissioner of Reclamation, constituting a joint report. Both agencies state that "the report represents the best practical plan for development of the Missouri River Basin for navigation, flood control, irrigation, reclamation, power, and all other beneficial uses of the waters of the Missouri River and its tributaries."

The committee found it possible to bring the two plans into agreement by recognizing the following basic principles:

(1) The Corps of Engineers should have the responsibility of determining main-stem reservoir capacities and capacities of tributaries for flood control and navigation.

(2) The Bureau of Reclamation should have the responsibility for determining the reservoir capacities on the main stem and tributaries for irrigation, the probable extent of future irrigation, and the amount of stream depletion due to irrigation development.

(3) Both agencies recognize the importance of the fullest development of the potential hydro-electric power in the basin consistent with the other beneficial uses of water.

Six major divisions

In discussing the two plans the committee divided the basin into six divisions:

(a) Upper Missouri River Basin (above Fort Peck).

(b) Yellowstone River Basin.

(c) Missouri River—Fort Peck to Sioux City.

(d) Minor Western Tributaries (the Dakotas).

(e) Niobrara, Platte and Kansas rivers and tributaries.

(f) Lower Missouri Basin (main stem below Sioux City; tributaries in Missouri).

The joint plan contemplates 99 reservoirs, including the few army projects already authorized in Kansas and Missouri, having a total storage capacity of about 81 million acre-ft. Of this capacity, some 48 million acre-ft. would be on the main stem in five projects in the two Dakotas. Added to Fort Peck's 20 million acre-ft., this would provide a total of 68 million acre-ft. on the Missouri River proper, and 101 million acre-ft. in the entire basin. The reservoir projects are shown on the accompanying map. To simplify that map, only the reservoirs referred to in this summa of the report are given by name.

The proposed projects, segrega by divisions, are as follows:

Upper Missouri Basin—As Army had no plans for the Miss and its tributaries above Fort P the original U.S.B.R. proposals w retained in full. These include reservoirs with a combined stora capacity of 1,237,000 acre-ft. Larg will be Canyon Ferry, on the m river just east of Helena, Mont., w a 2,000,000 acre-ft. reservoir and only project in this group develop power. Next in size is Tiber reserv on the Marias, a branch of the M River in northwest Montana, 915,0 acre-ft. Two more are fairly lar Wilson on the north fork of Sun Ri west of Choteau, Mont. (160,0 acre-ft.) and Clark Canyon on t Beaverhead west of Yellowstone Pa (150,000 acre-ft.). None of the r maining 15 reservoirs, scatter throughout the west and southw parts of Montana, will exceed 15,0 acre-ft. in storage capacity. These projects will supply water for irrig ing 460,900 acres of new land a supplemental water for 208,700 ac already under partial irrigation.

Yellowstone Basin — Two lar reservoirs in the original Army pr posal, one on the Yellowstone, t other on the Big Horn, were elimi ated in the joint report in favor of t much more comprehensive U.S.B. plan for 27 projects with a total st age capacity of 4,285,000 acre Eight of these include power develo ments. The only reservoir on t Yellowstone proper, Mission, east Bozeman, Mont., is the largest in t group with 890,000 acre-ft. capacit Three on the Big Horn, in Montan and Wyoming—Yellowtail, Kane an Boysen—will have capacities of 470 000, 750,000 and 730,000 acre-ft. r spectively. All except five of th group of projects are in Wyomin scattered along the Big Horn, Tong and Powder River systems. Irrigatio will be provided for 509,560 acres new lands, and supplemental wat will go to 204,500 acres now serve with an inadequate supply.

Missouri River—Fort Peck to Sioux City—On the main stem through th two Dakotas five dams will impou 72 percent of the new water storage i the entire basin. Two of the dam Garrison and Oahe, will rival Fo Peck in size. Listing the propose

projects in order upstream from Sioux City, first is Gavins Point, with its 200,000 acre-ft. reservoir extending from Yankton to Running Water, So. Dak. Next is Fort Randall, 5,160,000 acre-ft. storage, with a dam located at the east end of the South Dakota-Nebraska boundary, backing water to above Chamberlain. Third is another relatively small dam at Big Bend, 250,000 acre-ft. capacity, below Pierre. Just above Pierre is the largest of all reservoirs in the basin, the Oahe project storing 19,600,000 acre-ft. of water in a lake extending all the way to Bismarck, No. Dak. Last on the main stem is another huge dam, Garrison, located just above Stanton, No. Dak., impounding a 17 million acre-ft. reservoir extending beyond Williston, almost to the Montana line.

These five projects represent the biggest compromise in the two original reports, for the Army had figured on five dams, Gavins Point and Garrison as retained, a larger Fort Randall reservoir that would have overlapped the Big Bend reservoir and Oahe and Oak Creek, that together would have been smaller than the finally adopted Oahe project. The Bureau of Reclamation had contemplated only three dams in the area—Fort Randall, Big Bend and Oahe, all of which were retained as originally proposed by the bureau.

Garrison replaces an off-river reservoir just west of the Montana line originally proposed by the bureau, to be fed by diversion from Fort Peck and to be part of a long canal and pumping system to replenish Devils Lake and eventually augment the flow in the James River in the eastern Dakotas for additional irrigation. Devils Lake and the James will now be supplied by a diversion canal from the Garrison reservoir to the Sheyenne reservoir on the Sheyenne River, with a lateral canal to the lake, and by another diversion canal back into the Missouri basin feeding the Jamestown reservoir on the James River. Additional water will be brought into the lower James valley by a canal from the Oahe reservoir.

Garrison reservoir, located just below the Yellowstone River with its large silt contribution, will prolong materially the life of the downstream reservoirs. The compromise plan also utilizes practically all of the available power head in the Missouri between the mouth of the Yellowstone and the Gavins Point dam. These five projects, together with Fort Peck, are also expected to provide the desired degree of flood detention, supply needs of irrigation in the main river valley and the valley of the James, and furnish cyclic storage for navigation below Sioux City during prolonged drought periods.

Extensive construction operations are required to stabilize the channel of the Missouri because of the vast quantities of flood waters and their high silt content. Here shown is the pilot channel cut at Big Blue Bend and the dikes built to divert flow through the pilot channel to enlarge it.

Minor Western Tributaries—The original Army plan did not specifically designate any projects in the small streams flowing eastward through the Badlands of the western Dakotas, so the U.S.B.R. proposals for this area were adopted in the joint report. These rivers are extreme erratic in flow, some are almost dry at times, but all are subject to flash floods that carry great quantities of silt. On the Little Missouri, Knife, Heart, Cannonball, Grand, Moreau, Bad, Cheyenne and White rivers and their tributaries, 15 reservoirs are planned with a combined storage capacity of 1,237,000 acre-ft. Though much of the land in this area is not tillable, some 213,000 acres can be irrigated. Only two projects include power plants.

Niobrara-Platte-Kansas systems—On these three river systems, extending the length of Kansas and Nebraska into eastern Colorado and Wyoming, elimination of duplicate services in the two original plans leaves 25 projects in the joint report with about 6½ million acre-ft. total storage. One project, Kanopolis on the Smoky Hill River in Kansas, had already been started by the Army, but work was suspended on account of the war. Several others have already been approved by Congress in previous Army flood-control authorizations. Some power will be developed at a few of these dams. Water will be made available to irrigate 1,284,000 acres of new land.

Lower Missouri Basin—All development in the lower basin and exclusively presented in the original army plan was retained in the joint report. This includes a complete levee system on both sides of the river, where needed, from Sioux City to St. Louis, and six flood control dams, already authorized, on tributaries in Missouri, as well as local flood protection in the Kansas City metropolitan area. A 9-ft. navigation channel from St. Louis to Kansas City, and a 6-ft. channel beyond to Sioux City would be maintained. A combination of channel improvements and dredging and release of water from storage reservoirs above would be required to maintain these navigation depths. The

Army Engineers believe that a 9-ft. channel all the way to Sioux City might be feasible at reasonable cost.

The joint plan will irrigate 4,760,000 acres of new land and supply additional water to 538,000 more acres already under ditch but inadequately served. These irrigation districts are scattered throughout the basin, except in the lower valley. Some are in the small headwater streams, others are in the larger river bottom lands, such as the Yellowstone, Platte and Missouri, and still others are on bench lands that can be reached only by pumping.

In the combined project are 22 power plants with a total installed capacity of 1,154,500 kw., all outlined in the original U.S.B.R. report. Five of these plants, totalling 396,000 kw. in capacity, would operate seasonally and be used almost exclusively for irrigation pumping. The remainder, while subject to reservoir regulation for flood control, irrigation and navigation, are estimated to produce 3.8 billion kw.-hr. firm power annually for sale.

The original army plan did not go into the power aspects, except to quote a letter from Leland Olds, chairman, Federal Power Commission, to the effect that "It appears that at least 10 billion kw-hr. of additional hydroelectric energy per year may eventually be developed in connection with the storage dams without sacrifice of other benefits which the river and its tributaries should contribute to the growth and welfare of the region."

Economics of the development

As exact size of dams and final determination of the power installations are to be agreed upon after further joint study by the two agencies, the exact costs, full benefits and returns cannot be stated at this time. However, costs probably will not be far from the original Bureau of Reclamation estimates of $1,257,645,700. The development work would be done in stages, the extent and order to be determined by subsequent studies.

The Bureau of Reclamation estimated in its report that of the above over-all cost, a total of $516,545,700 would be allocated to non-recoverable cost of navigation and flood control, leaving $741,100,000 as reimbursible through sale of water and power. Annual benefits are estimated at $168,306,000, against an annual cost of only $65,413,000, including amortization of the entire cost in 50 years.

Further details of the combined plan, especially as to availability of water, were given by Brig. Gen. R. C. Crawford, division engineer, Missouri River Division, in a talk to the Upper Mississippi Valley Association at St. Louis on Nov. 28. He stated the average annual discharge at the mouth of the Missouri River is 45,000,000 acre-ft. Assuming the reservoirs to be full at the beginning of a 12-year dry cycle similar to that of 1930-41, the average annual requirement for the irrigation of the 2,300,000 acres which it is proposed to reach from these reservoirs is 3,500,000 acre-ft. Probably another 1,000,000 acre-ft. will be lost due to evaporation and domestic depletions, thus making a total average demand on these reservoirs of about 4,500,000 acre-ft. for purposes other than navigation. The average annual runoff above Yankton during such a period of drought will be about 13,000,000 acre-ft. after making allowance for all depletions due to upstream irrigation. The net gain each year will thus be about 8,500,000 acre-ft. Over a period of 12 years the 68,000,000 acre-ft. of storage could furnish 5,700,000 acre-ft. annually, which, added to the net gain of 8,500,000 acre-ft. from runoff, would make 14,200,000 acre-ft. available for navigation. It is believed that this is adequate for a 9-ft. navigation channel on the lower river.

A slightly different breakdown of costs than that shown in the accompanying table was also given by Gen. Crawford. He estimates the total cost at $1,400,000,000, allocated as follows: flood control features, $196,000,000; power features, $151,000,000; irrigation features, $460,000,000; and multiple-purpose features, $593,000,000.

At the Omaha meeting where the two plans were reconciled the army engineers were represented by Gen. Crawford and Gail A. Hathaway, head engineer, office of Chief of Engineers. W. G. Sloan, assistant regional director at Billings, Mont., and John C. Riter, acting director of the branch of project planning, Denver, Colo. were present for the Bureau of Reclamation.

ESTIMATED PROJECT COSTS, ALLOCATIONS AND RETURNS
(BASED ON U. S. B. R. ORIGINAL PLANS)

Summary of Benefits	**Annual**
Irrigation	$130,000,000
Power	17,141,000
Flood control	16,500,000
Navigation	4,165,000
Municipal water	500,000
Total	$168,306,000
Annual Costs	
Operation, maintenance, repairs and replacements	
Irrigation	$7,725,000
Power	4,316,000
Flood control and navigation	4,500,000
Amortization of entire cost of project at 3 percent in 50 years	48,872,000
Total annual cost	$65,413,000
Ratio of annual costs to annual benefits	1:2.57
Repayments and Returns	
Total estimated cost	$1,257,645,700
Allocation to—	
Flood control	$419,300,700
Navigation	97,245,000
Subtotal	$516,545,700
Balance repayable	$741,100,000
Repayments from—	
Irrigation (40 annual payments)	$298,000,000
Power (50 annual payments)*	423,100,000
Municipal (40 annual payments)	20,000,000
Total	$741,100,000

*In addition to the repayments indicated, power revenues will also be sufficient to cover the interest charges on the costs allocated to power.

Maryland Issues Manual for Municipal Postwar Planning Guidance

TO STIMULATE the preparation of local postwar public works plans throughout the state, the Maryland Commission on Post War Reconstruction and Development recently issued a manual setting forth details of state financial aid and the procedure for requesting such aid. The state has made available a fund of a half-million dollars, and with this fund is ready to make grants to local governments that will pay for one-half the cost of preparing plans for capital improvements.

The manual points out that during the past few years there has been little, if any, replacement, renovation, or expansion of physical facilities by the various levels of government throughout the state. With the cessation of hostilities the picture will change completely and many adjustments will have to be made. Some of the problems in this period of adjustment can be relieved by local governmental units embarking on a program of reconstruction.

State has funds for project plans

To be able to do this, however, requires that the state, counties, cities and other governmental units know what they want, and have prepared plans and specifications with which to begin construction. These cannot be prepared overnight. Usually considerable thought must be given to the determination of site, size and character of construction before plans are even begun. Projects are often related and interdependent upon each other. If duplication or conflict is to be avoided some overall program must be developed.

The state authorities have recognized the need of present preparation for the postwar period. To this end Chapter 710, Acts of 1943, provided three funds: a war emergency fund, a general emergency fund, and a postwar construction fund. This latter fund is an authorization "to the Board of Public Works, for construction and other capital improvements at state institutions, and for other agencies, in connection with carrying out any program to be adopted by the state in providing for postwar projects."

The Board of Public Works has interpreted the provision of this Act to include financial assistance to local units of government for the preparation of their postwar programs, with all plans and specifications to be prepared by qualified architects and/or engineers.

Merely to have funds available is not sufficient to provide for a postwar construction program, it is stated in the manual. The state authorities recognized this fact and the General Assembly provided for the creation of a Commission on Post-War Reconstruction and Development. This agency is empowered to order and direct the preparation of plans.

This commission recommended to the Board of Public Works that the state contribute to or through the appropriate public agency, one-half of the cost of construction designs, plans and specifications to include preliminary engineering studies but not to exceed a total state contribution of more than half of 5 percent of the approved estimated cost of any building or project approved by the commission and by the state Board of Public Works.

The Board of Public Works has approved the recommendations of the Commission and authorized it to proceed with the development of this program.

By approval of this proposal the state of Maryland proposes to pay one-half the cost of the preparation of plans and specifications for capital improvements subject to the conditions noted.

Procedure for obtaining aid

To secure this aid, says the manual, each community or local government unit is required to do the following things:

1. Make application for a state grant to the Commission on Postwar Reconstruction and Development, subject to the approval of the Board of Public Works. This application should describe the project, give a preliminary estimate of its construction cost, the value and desirability of this project as a community and postwar project and other essential information as indicated on a form provided for this purpose. A separate application must be filed for each project.

2. Give assurance that the local share of the costs will be available. A resolution adopted by the local legislative body guaranteeing this participation must accompany the application. (A copy of the required resolution is given in the manual).

These are the preliminary steps. This application will be studied by the Commission and the Board of Public Works. Additional information may be requested by the Commission to support the application. If the Commission approves the project the local community or unit will be notified by the Board of Public Works, which will send an offer for acceptance.

This offer, good for thirty days, will indicate the state's share of the cost of preparing plans and specifications made, subject to the joint participation by the local governmental unit.

When the above action has been taken the procedure for the succeeding steps will be as follows:

1. The governmental unit will have thirty days in which to certify that it has accepted the terms of the offer and that it has made available an amount in addition to the state grant sufficient to prepare the plans and specifications for the project. Failure to do this within thirty days will result in the State rescinding the offer.

2. A report giving data and information relative to the progress of the plans and specifications on each project shall be submitted periodically to the Commission.

3. Payment for the preparation of plans and specifications shall be approved by the Commission and subject to the order of the Board of Public Works.

The manual outlining these steps was prepared by I. Alvin Pasarew, executive director, under the direction of Roy B. White and Abel Wolman, chairman and vice chairman respectively of the Maryland Commission on Post War Reconstruction and Development. Consultants for the Commission include Nathan L. Smith, Ezra P. Whitman and J. F. Pyle. In addition to Mr. Pasarew as executive director, the staff of the Commission includes Thomas F. Ubbard, technical consultant, Albert C. Klingenberg, field representative, and Guy E. Gaston, technician.

Fig. 1. Preliminary to pumping out Steep Rock Lake for recovery of iron ore, a lake on the diversion route was d

Moving a River and Draining a Lake For Open-pit Mining of Iron Ore

Norman S. Bateman
Consulting Construction Engineer
C. A. Pitts General Contractor Ltd., Toronto, Ont.

***Contents in Brief**—One of the most diversified of rush war construction jobs has been the Steep Rock project in Canada where the face of nature has been altered extensively to permit open-pit recovery of iron ore from beneath a wilderness lake. A river was rerouted and 120 million gal. of water is being pumped out to expose high grade iron ore deposits. A construction innovation was the use of a tunnel, on the flow line of an open diversion channel, for relieving purposes in rock blasting; the scheme required only half the usual explosives and resulted in better fragmentation. Highways, a railroad extension, ore docks and a transmission line are part of the project, which is internationally financed and directed.*

In Canada, just north of the Minnesota line, engineers have completed a rearrangement of nature's topography to permit open-pit mining of 50 million tons of high grade iron ore found under water. A lake with a surface area of 15 sq. mi. was lowered 50 ft.; a new channel prepared for diversion of a river; a large lake pumped down and soil overburden removed; and, from deep below the lake bed, iron ore already has been shipped by rail to Port Arthur, thence by lake boat to the steel mills of Canada and the United States.

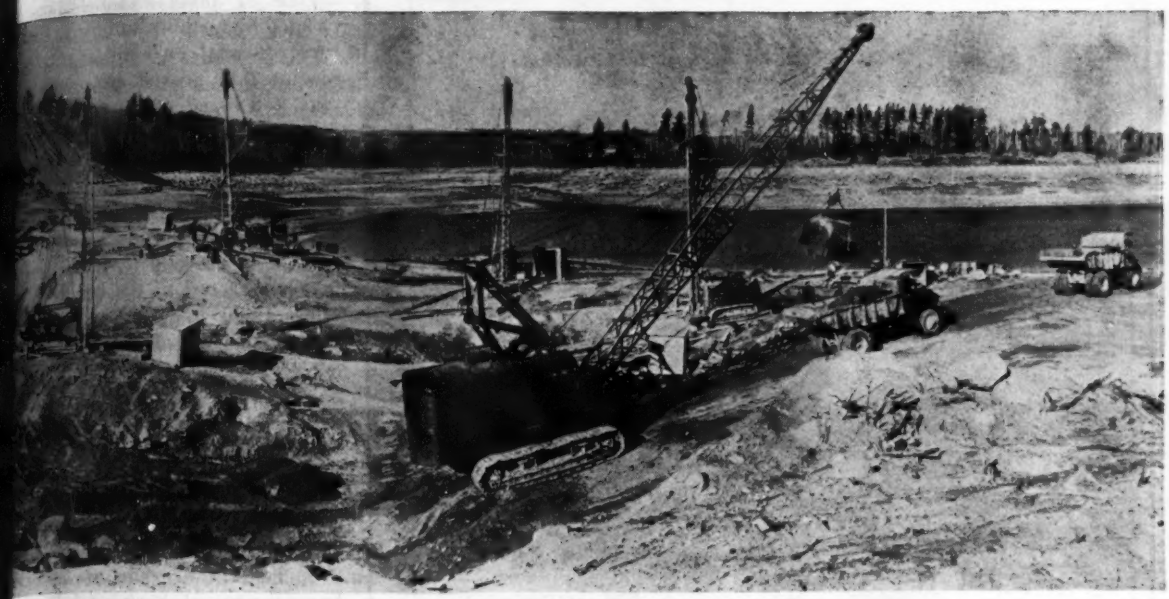
Known as the Steep Rock project, the mining venture is one of the largest, and certainly one of the most diversified, engineering projects undertaken in Canada. It is a few miles north of the village of Atikokan, Ontario, Canada, in the Rainy Lake area about 40 miles north of the U. S.-Canadian boundary and 125 miles west of Port Arthur.

The project can logically be divided into three consecutive construction developments of outstanding interest. First of these is diversion of the Seine River to an entirely new course; second is the pumping of the waters of Steep Rock Lake, a body of water from 100 to 400 ft. deep with an area in excess of 6 sq. mi.; and third, the stripping of millions of cubic yards of overburden from the bottom of Steep Rock Lake overlying the iron ore.

While the purpose of this article is to tell the story of the construction necessary to make possible the mining of ore, a brief hsitory of the discovery of the ore deposit may be of interest.

Ore known since 1897

As far back as 1897, float bodies of high grade hematite were found along the southern shore of Steep Rock Lake, indicating to geologists that large iron ore bodies existed beneath the water. Subsequent intermitten



...gh a tunnel, then a 132-ft. deep cut made to provide a permanent channel adequate for flood flows.

investigation eventuated in the formation of the Steerola Exploration Co. Ltd., to prospect for the ore believed to be at the bottom of the lake.

Exploration for ore presented quite a problem in water as much as 400 ft. in depth. Explorations were conducted by diamond drilling from the ice during the winter months, supplemented by electronic devices. Two ore bodies were discovered and, in 1939, Steep Rock Iron Mines Ltd. was incorporated, purchased the assets of the Steerola Co. and continued investigation of the ore body. The latter investigations showed a third ore body and indicated the extent of the first two.

Analysis of the samples obtained indicated that the iron ore beneath the lake is of a purity not exceeded by any comparable deposit known in the world. An important advantage of an ore of this quality is the tremendous saving in the amount of scrap iron required for smelting with it. This ore also can be put through the open hearth furnaces about 16 percent faster than other available ore.

The three ore bodies have a total length of 8,000 ft. and are 150 to 450 ft. wide. The ore has been penetrated as much as 1,000 ft. below the bed of the lake without establishing its lowest extent. Mining officials have based their plant planning on removing 50 million tons of ore, an amount that can be mined by relatively shallow operations in open pits. It is virtually certain that the ore bodies contain many times that amount of good ore.

Diverting a river

To permit recovery of the ore, Steep Rock Lake is being unwatered. To unwater it had to be isolated from its normal flow, and to accomplish this isolation the inflow waters were diverted to bypass it. Referring to the accompanying map it may be seen that Steep Rock Lake is part of the original channel of the Seine River, which flows westerly into Rainy Lake. A power plant and dam are located at the head of Steep Rock Lake, the dam creating a reservoir known as Lake Marmion with surface about 100 ft. above the water of Steep Rock Lake.

By following the heavy arrows indicating the diversion it will be seen that the waters first pass westerly through a canal into a small landlocked lake known as Raft Lake. At this point a control and spillway dam has been constructed to regulate the outflow of the diverted waters. From Raft Lake the waters flow through a second channel to Lake Finlayson and from the south end of Finlayson through a third canal, known as Esker Cut, into the western arm of Steep Rock Lake where a second spillway dam and control works have been constructed.

This latter dam, known as Wagita Bay Control Dam, is not necessary for the first stage of mining but has been constructed for possible later diversion of the water from the western arm of Steep Rock Lake when it may become desirable to recover ores believed to be under that section. For the current diversion, water is permitted to flow through the control works and return to its original channel in the western arm of Steep Rock Lake. Water is prevented from flowing back into the middle arm by two short dams across the "Narrows" at Channel Island.

Looking at the map, and without regard to peculiar topography, the problem appears relatively simple. However, though only a narrow strip of land seperates Marmion and Finlayson lakes, the normal water of Lake Finlayson was 33 ft. higher than that of Marmion and that of Raft Lake 2 ft. higher than Finlayson. The water of Finlayson, although paralleling the Seine River and separated only by an irregular rock ridge, flowed northeasterly some 15 miles until it found its way into the Seine, which flowed in the opposite direction just below it. Thus to divert Lake Finlayson, its water had to be lowered below that of Marmion and its flow reversed.

At the south end of Lake Finlayson an esker ridge of gravel and sandy drift formed a natural barrier some 1,200 ft. wide beyond which the land dipped to a low swamp more than 60 ft. below the lake surface. Thus,

Fig. 2. The Seine River has been diverted from its original course through the eastern and middle arms of Steep Rock Lake to permit unwatering of the lake and open-pit mining of iron ore.

to reverse the flow of the waters of Lake Finlayson, it was necessary to cut a canal through the ridge. This required excavation of about 1,235,000 cu. yd. of earth and 80,000 cu. yd. of rock. Because the upper material was such that it would cut readily if exposed to water, it was not safe to start a small channel and let it widen by erosion as serious flooding downstream probably would result. Lowering was accomplished by driving a 10 x 12-ft. drainage tunnel from the dry side of the esker ridge into solid rock until safe rock cover below the ridge was attained and then beneath the ridge and up under Lake Finlayson. The final rock cover of about 12 ft. was blasted out in one heavy shot, permitting the lake to reverse its flow.

Diversion through the ridge between Marmion and Finlayson lakes could most economically be made through the natural depression at Raft Lake. The lake was pumped out and cuts made through two intervening ridges to a depth of 40 ft. below the water of Marmion Lake. These canals aggregate about 3,000 ft. in length and have base widths of 100 ft. and maximum depths of 80 ft. Their construction required excavation of about 650,000 cu. yd. of green andesite rock, which had an almost vertical shear.

One of these channels was e
cavated by methods unique in the hi
tory of canal or similar cuts by
scheme that proved so successful
may well be adopted on many futu
jobs. While the waters of Lake Ra
and Finlayson were being lowere
two shafts 7 x 8 ft. were sunk fro
the top of the cut to a point abo
4-ft. below the grade of the can
One shaft was 500 ft. from the Ra
lake (east) end of the canal and th
other 1,000 ft. Both were on th
exact centerline of the excavation.

Tunnel relieves blasting

From the two shafts a horizont
tunnel 7 ft. high by 8 ft. wide wa
driven on the centerline of the cana
It extended 375 ft. east of the ea
shaft and about the same distance be
yond the west shaft, with inver
2 ft. below the grade of the cana
From the tunnel, horizontal diamond
drill holes were driven from eac
side to the extremities of the propose
excavation. Meanwhile, vertica
diamond-drill holes were sunk fro
the surface to within 7 ft. of grade
The pattern of these holes was 7 ft
transverse to the cut and 6 ft. longi
tudinally with the cut. On the out
side longitudinal rows, the holes wer
on 3-ft. centers. Sectional tampin
rods, threaded on sash cord, were use
for loading the vertical holes. Al
holes were of 1½ in. diameter.

Two rows of holes were shot wit
each blast, making an advance of 12
ft. along the centerline of the canal
In shooting, the underground hole
were timed to explode an in
stant before the vertical holes,
resulting in a cave or undercut 12 ft
along the centerline and 7 ft. high
being blasted out of the face acros
the width of the canal, at grade. Then
delayed charges blasted a 12-ft. sec
tion out of the face above the under
cut. The clean lines thus obtained
with virtually no over-break are
shown in Fig. 5. Primacord was
used on all underground holes, elec
tric exploders on the top holes.

Saved half of explosives

The advantages attained by using
the above method were many: About
44 percent less explosive was used
than on a similar cut on the same
location that was blasted only in holes
made from the surface by well-drills.
Better fragmentation was secured,
thus reducing the secondary drilling

required and there was virtually no over-break. A smooth level floor, broken to exact grade resulted, and canal sides were cut to exact line. Drilling and loading in the tunnel could be done below water level in preparation for blowing out the final plug to extend the excavation out to and even beyond the edge of the lake.

Rock was removed from open cuts starting from each end of the canal. The cuts were ramped down until a full face excavation was established. After the headings had been united to make a through channel the shovels turned to the ends and excavated the ramps, leaving a rock plug at each end of the canal to be blasted out on the day of the diversion.

For power needs until a new line was built into the project, Lake Marmion had to be maintained at full pool level, 25 ft. above the floor of the diversion canal. A rock plug 27 to 35 ft. high was left as a dam to exclude Lake Marmion. The plug had a 30-ft. top and sloped down about 30 deg. to the intersection of grade at the lake bottom. To effect final diversion the plug was blasted out in one shot.

Diamond-drill holes, about 2-in. dia., were bored into the face of the plug from the floor of the canal as lifters. These were in three rows, the top row 5 ft. above grade were horizontal, and 50 ft. deep on 1-ft. centers. The second row was about 2 ft. above grade, 80 ft. deep on 1-ft. centers and inclined downward at 6 deg. The third row at the bottom of the face was 20 ft. deep and inclined on the same slope.

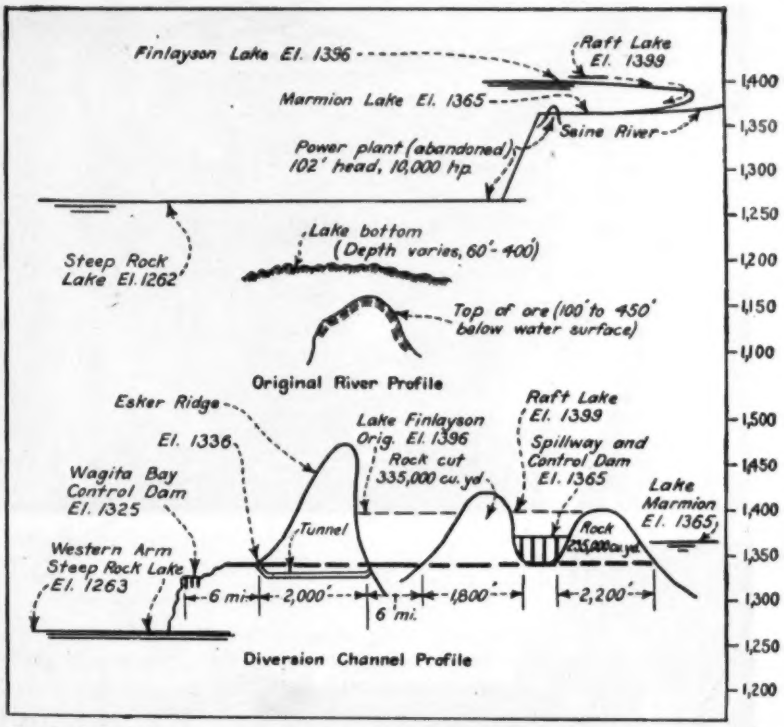


Fig. 3. Raft Lake was pumped out and Finlayson drained through a tunnel. The cuts along the diversion line provide a permanent channel for the Seine River.

From the surface, the 30-ft. top was patterned with vertical jack-hammer holes on 3-ft. centers, extending to within a short distance of the horizontal diamond-drill holes. Supplemental diamond-drill holes were made on an incline from the top into the back slope, extending under Lake Marmion, to insure virtual disintegration of the blasted rock by equal distribution of the dynamite.

This blast, designed by the writer, was shot Jan. 26, 1944, and the plug at the Lake Finlayson end was shot immediately afterward. The proportion and distribution of explosive was so effective that virtually all of the plug material was blown free of the canal. No shattered rock whatsoever had to be removed by mechanical means following the blast. Eighteen-tons of 75-percent gelatin dynamite was used on the larger plug, with electric exploders wired in series

Fig. 4. Raft Lake Spillway Dam controls the diversion of the Seine River and holds some of the water to meet low flow needs. The paver placed concrete directly into the forms.

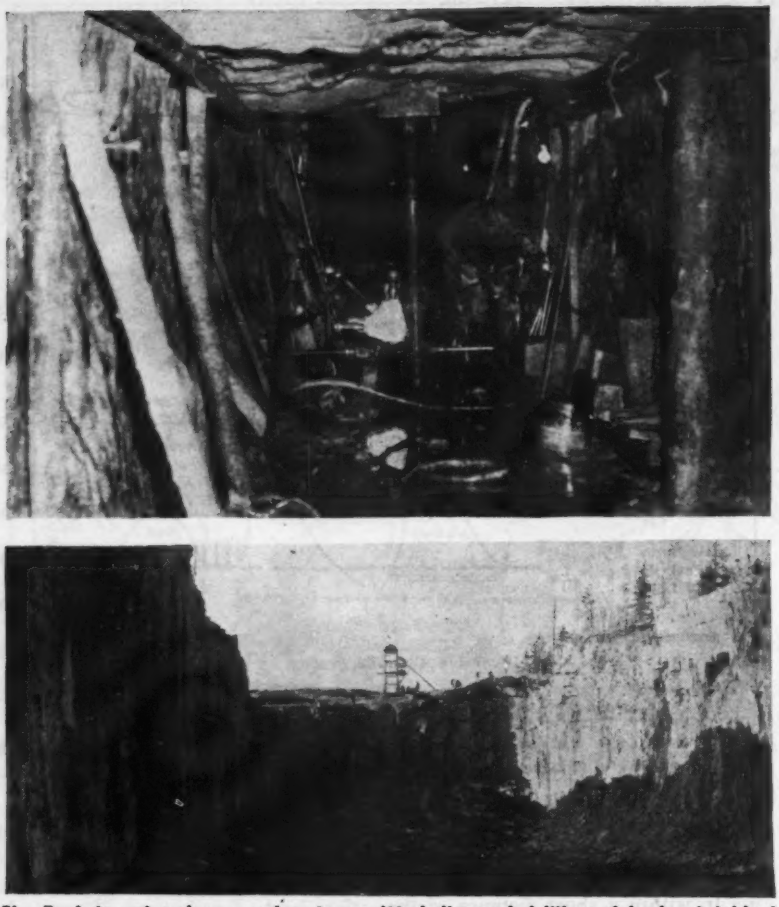


Fig. 5. A tunnel under a rock cut permitted diamond drilling of horizontal blast holes, which were fired just before conventional holes drilled from the surface. This formed a "reliever" so that rock could be shot down rather than up, saving half the explosives and giving better fragmentation. Walls and floor broke to a line with almost no overbreak.

of 20, and discharged by a portable generating plant.

Storage in Lake Marmion is to be maintained for the benefit of power plants on the Seine River below Steep Rock Lake. Before water was diverted to the Raft Lake cut a permanent spillway and control dam was built across the channel. The spillway section of the dam is about 1,100 ft. long and is at El. 1365, the original level of Lake Marmion. The spillway dam is relatively low but has an extremely massive section because of the tremendous ice pressure to which it will be subjected each spring. The control section across the canal proper has three main stop-log gates and one log-sluice gate.

Concrete for the control works was made with coarse aggregate hauled from a granite deposit 10 miles distant. A primary crusher and a 300-ton secondary portable crushing and screening unit were set up at the quarry. Sand was obtained from the excavation for Esker Canal. Aggregates were batched into trucks from a 1-cu. yd. weigh batcher and most of the concrete mixed by a conventional paver, depositing directly into the form. Concrete in the control section was placed with a crane and bucket.

To prevent the water following its earlier course through Steep Rock Lake during flood runoff, the crest of the spillway and control dam at the lower end of Lake Marmion was raised 5 ft. by means of flash boards. These units were in 7-ft. panel sections, fitted slot-wise into structural bracket channels, anchored into the concrete at the crest of the dam. The panels are 3-in. lumber, faced with 1-in. boards with tar paper between.

Two short dams, one on either side of Channel Island, were constructed to prevent backflow from the diverted water into the lower end of the middle arm of Steep Rock Lake. Known as the Narrows Dams, these are bulkhead type construction with parallel rows of steel sheetpiling driven in the form of an arch and the walls tied together and filled with sand and gravel. Rock-filled wood cribs were constructed at one end to form an anchor, and rock placed on both sides of the sheetpile section to stabilize the cofferdam. The full width of the top of the dam is about 60 ft. and it is being used as a permanent roadway.

Considerable difficulty was experienced in placing the rock fill as the bottom of the narrow channel connecting the two arms of Steep Rock Lake was in the form of a hump, sloping quickly into the western arm. Greatest depth to rock on the dam location was about 60 ft., the rock being covered with a soft overburden of "loon" mud about 25 ft. thick at its deepest point. It was found that the loon mud would coat the rock fill as it was dumped, sliding suddenly and permitting the rock fill to drop as much as 20 ft. vertically at one time, thus unbalancing the entire dam. It was difficult to hold the rows of steel sheetpiling, a problem overcome only by dumping until the fill extended far enough that slides did not occur.

Wagita Bay Dam

Two dams control the flow from the new channel. One of the dams merely raised a low spot to impound the diverted water. This is about 1,000 ft. long, an earth fill with a Wakefield-pile diaphragm, designed to be driven about 12 ft. into the original ground below the fill and extending above the ground to within a few feet of the top of the fill to prevent infiltration. The contractor elected, instead of driving piling, to excavate a trench with a dragline, build the diaphragm in place with laminated 2-in. lumber and then backfill with selected material. This not only resulted in more economical construction but provided a more impervious core and one of known depth and security.

The other dam is primarily for a possible further diversion of the flow to permit pumping out the western arm of Steep Rock Lake if future explorations show expected ore in

commercial quantities. This structure, the Wagita Bay Control Dam is of concrete with a spillway about 500 ft. long of conventional construction, built in the dry. The control section consists of a single gate 12 ft. wide fitted with 12 x 12-in. stop logs.

Pumping 120 billion gal. of water from the middle and eastern arms of Steep Rock Lake is the second major part of the project. Fourteen 24-in. pumps, working 24 hr. per day, handled more water than was used by the fourteen largest cities of Canada in the same length of time.

Pumps mounted in pairs

The fourteen pumps are mounted in pairs on seven barges. Each pump is directly connected to a 500-hp. motor and has a rated capacity of 23,000 gpm. (U. S. gal.) at a 63-ft. head. When pumping started each unit discharged through a separate 24-in. pipeline directed into a 400-ft. long 8 x 12-ft. tunnel to keep the water lift to a minimum. The pump barges move out from the shore and go down with the water, maintaining a constant suction lift of 7 ft. About 500 ft. of spiral welded pipe, with flexible couplings, was provided for each pump. A sliding bridge and a short section of rubber hose, Fig. 6, make the connection from barge to shore.

When the pumping head reached about 100 ft., delivery from individual pumps had dwindled to 18,000 gpm. and the two units on a barge were connected in series to provide double the power for water discharge. Pipe from the two units was combined to make 1,000 ft. available for each barge as it moved out and down from the discharge point as the lake level receded.

The first pump started Dec. 15, 1943, and all 14 were operating by Jan. 4, 1944, the lake level being lowered about 7 in. per day. The rate remained fairly constant for several months, the increased head being compensated by the smaller surface area. All pumps operated 24 hr. per day up to June when the lake level had been lowered sufficiently to permit start of stripping. Subsequently the pumps have been operated to take advantage of off peak power rates and will continue under this reduced schedule for many months.

Careful investigation was made prior to the start of the project to locate subterranean channels or pervious material through which water might enter the lake bed but none were found. To date no appreciable inflow of subsurface water has been noted.

Many natural obstacles

The project was hampered throughout the construction period by inaccessibility, rugged terrain and severe winter weather. Atikokan, the rail head for the construction operation, is a wilderness village sprawled along the railroad tracks, its only and rather dubious claim to distinction being its rating as the second coldest settlement in Canada. Temperatures to minus 60 deg. F. are quite common and prevailing winter temperatures are sub-zero. There is no highway of any kind within 60 miles of the village with the exception of the construction roads built for the mining operations, the railway being the only means of transportation to and from the locality. Mail, passenger and express service is three times weekly each way, (east and west).

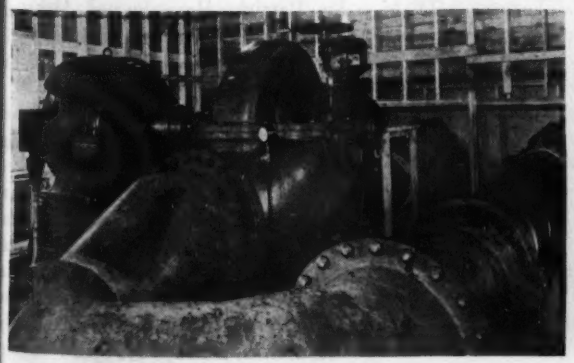
The terrain is some of the most rugged and forbidding in Canada east of the Rocky Mountains. The entire area where construction has been under way consists of a series of irregular rock ridges and swamps covered with dense jack pine, cedars, poplar and contiguous growth. Small land locked lakes of great depth and various elevations dot the country.

Formidable highway job

Before actual construction on the Seine River diversion could begin, it was necessary to build about 22 miles of main haul road to key points so that equipment and supplies could be moved to the work. The road project consisted of three individual sections of about equal length. The first was from Atikokan to Steep Rock Mine headquarters, located just north of the "Narrows" of Steep Rock Lake. This section required two bridges, one about 500 ft. long and the other 200 ft. Both were of pile and timber construction, with 18-ft. roadways. The second road section connected the headquarters to the Esker Canal area at the southern end of Lake Finlayson. The third section meanders northeasterly to provide access to the Lake Raft area.

Because of the heavy volume of traffic to be accommodated (100 to 150 trucks, many of them of 15-ton capacity) the roads were constructed to a standard that compares favorably with Class B gravel roads. They are from 18 to 30 ft. wide, the first section being the widest since it is to be used as a permanent highway between Atikokan and the mine headquarters. Average net cost per mile was about $7,500.

Road construction started early in February 1943 with pile driving equipment moved in ahead of road gangs over the ice of Steep Rock



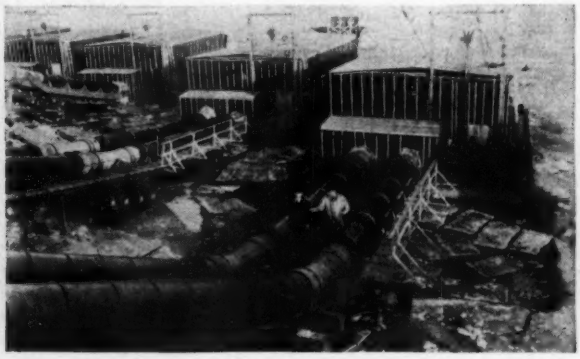


Fig. 6. (Left) One of two 23,000 gpm. at 63 ft. head pumps mounted on a single barge. After pumping head reached 100 ft. the two pumps were used in series. A flexible connection and sliding bridge connects the pumps to the discharge.

Fig. 7. Stripping overburden is done largely by suction dredge, with the earth loosened by 6-in. hydraulic monitors.

Lake. As soon as road clearing was completed to Lake Finlayson, material was dragged in, by horses and tractors, to begin construction of camps for the Esker Canal cut. A strenuous, but unsuccessful, effort was made to drive the road through to Lake Finlayson so that heavy drilling and excavating equipment for the Raft Lake cut could be moved in before spring thaws made the ice unsafe. Some success in this respect was attained, however, as camp supplies, small machinery and material to begin camp construction were hauled in before the ice failed. The road to Raft Lake, traversing the most formidable terrain of all, was not completed until the latter part of July.

To overcome some of the natural conditions, and as an inducement to obtain high quality construction workers, the contractor provided excellent camp accommodations. There were four main camps and four smaller ones. All camps were equipped with electric lights and portable generators, running hot and cold water, shower baths—modern sanitary facilities and comfortable housing.

Stripping by suction dredge

More than 1,000,000 cu. yd. of overburden has been removed from over the largest ore body, located at the junction of the eastern and middle arms of Steep Rock Lake. This ore body is at the highest elevation, has the least overburden and is nearest to the railroad and thus could be reached most economically.

Stripping of the 20 to 120 ft. of overburden over the first ore is being done with a 15-in., 750-hp. suction dredge operating in a cone started in the top of the overburden. Six-inch hydraulic monitors cut the soft waste material and carry it into a pool from which the dredge pumps it to a point in the lake below which there is no ore. Water for the sluicing and dredging operation is pumped from the lake by one of the 24-in. barge-mounted units. Heavy solids and material immediately over the ore body are removed by shovels, draglines and trucks.

A bridge across part of the central arm of Steep Rock Lake permits truck hauling of ore from the open pit to a crushing, screening and loading terminal with a daily capacity of 12,000 long tons. Some ore already has reached the smelters. It is expected that full scale stripping operations and mining of ore will continue through the winter with ore stockpiled during the time the Great Lakes are closed to navigation. It is anticipated that a million tons of ore will be shipped during the 1945 season.

Financing and management

Canadian-born Cyrus S. Eaton, who founded the Republic Steel Corporation, is chairman of the board of Steep Rock Mines, Ltd., Toronto. D. M. Hogarth, director of several large mining companies in Ontario, is president and M. S. Fotheringham is resident manager of the company that is spending $6,500,000 to reach ore. About $1,000,000 had previously been spent on exploration and drillings. The U. S. Government, through the Reconstruction Finance Corp., loaned the company $5,500,000 Canadian funds, and Cleveland capitalists bought $2,250,000 of the company's obligations.

The Canadian government's contribution to the project, through the Canadian National Railway, is $300,000 railway spur from Atikoka to Steep Rock Lake, a $2,500,00 dock at Port Arthur for trans-shipment of ore to Canadian and American steel mills, and $1,000,000 subsidies. The C.N.R. also has bui 250 cars in which to haul the o to the lake ports.

The Province of Ontario, throug the Hydro-Electric Power Commission, has constructed a $1,400,00 power line to the site to supply 7,00 hp. required for driving the pump and as replacement power for th hydro-electric plant made useless the head of Steep Rock Lake. Th 142-mile transmission line, from Por Arthur, was completed in 180 days utilizing twin-pole H-frame construction with 50-ft. western cedar poles i spans averaging 525 ft.

Diversion of the Seine River, including excavation, roads, bridges and camp structures was done on a cost-plus percentage contract by C. A. Pitts General Contractor Ltd., Toronto, Ont., for whom J. G. McKay was resident superintendent and the writer consulting construction engineer. The tunnels were excavated by Patrick Harrison of Montreal. Diamond drilling was done by Boyle Bros. Drilling (Eastern) Ltd. of Canada.

C. A. Pitts not only supervised personally all of the construction from its inception but also financed the start of the work after promotional difficulties had resulted in delays that would have rendered impossible completion of the project in time for its utilization in 1944. The diversion work actually required only ten months, perhaps the speediest construction on record for such a diversified project.

"Unfabricating" 4,000 Tons of Steel

***Contents in Brief**—An estimated 4,000 tons of steel was salvaged from the Russian steamer Illjich, accidently sunk, at a Portland, Ore., pier. The vessel was cut into sections by divers operating oxy-hydrogen torches, and the pieces removed with a large floating crane.*

AN UNUSUAL subaqueous salvage job was undertaken recently in the Willamette River at Portland, Ore., where the Russian steamer *Illjich* turned on its side and sank at the pier. The vessel was abandoned by the owners, thus leaving to port authorities the problem of how to remove the obstruction to navigation. How the job was done at minimum cost by cutting the hulk away, piece by piece, after salvage firms had shown a lack of interest in taking a contract, is described in the following.

The *Illjick* was a steel steamer 385 ft. long built in Scotland in 1895. Though its history is somewhat obscure, it is believed at one time to have been the royal yacht of Czar Nicholas of Russia. Of late it has been handling freight out of Portland and prior to the accident had been undergoing repairs at the pier. Just what caused the vessel to turn on its starboard side and sink is not clearly established. The accident occurred so quickly that the life of one crew member was lost.

For a time the vessel rested on the bottom entirely submerged, as will be apparent from observing the high water line in the river as shown on the fender pile in Fig. 1. When the owners abandoned the ship where it lay the matter was given considerable study before it was decided that responsibility for removal of the hulk as an obstruction to navigation rested with the Corps of Engineers, U. S. Army. Thus the problem of how to do the work was put up to the district engineer at Portland.

Bids for removal of the vessel by private firms were invited. Two were received. One of these was for $50,000 plus cost of the removal operations, whatever they might be, and the other one was a lump sum bid of $489,000. The latter contemplated raising the sunken vessel with the aid of pontoons and towing it down the Columbia River and out in the ocean where it could be sunk in deep water. This lump sum bid is said to have included the possibility of losing the hulk and having to again raise it from the bottom during the trip from Portland to the sea. These bids were rejected by the district engineer who then decided to do the work on a force account basis with the expectation of saving the government many thousands of dollars.

The program finally selected was to cut up the vessel with oxy-hydrogen torches operated by divers, and lift out the pieces one at a time with a large crane. In this way the hazard attendant upon an attempt to move the complete hulk would be eliminated and there would be some return from the salvage of an estimated 4,000 tons of steel. Prospect for success of this plan was materially advanced when it was found possible to arrange with the War Shipping Administration for borrowing the floating derrick barge *Cairo* with which the largest pieces that it probably would be desirable to lift out

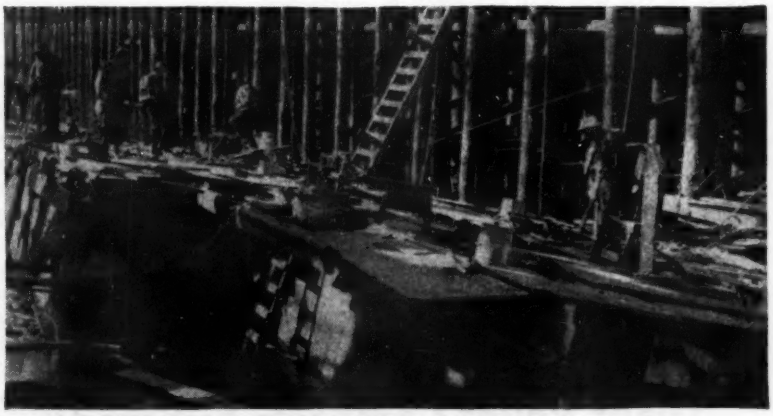


Fig. 1. Remainder of the Illjich, lying on its side on the bottom. Note high water mark on the piling.

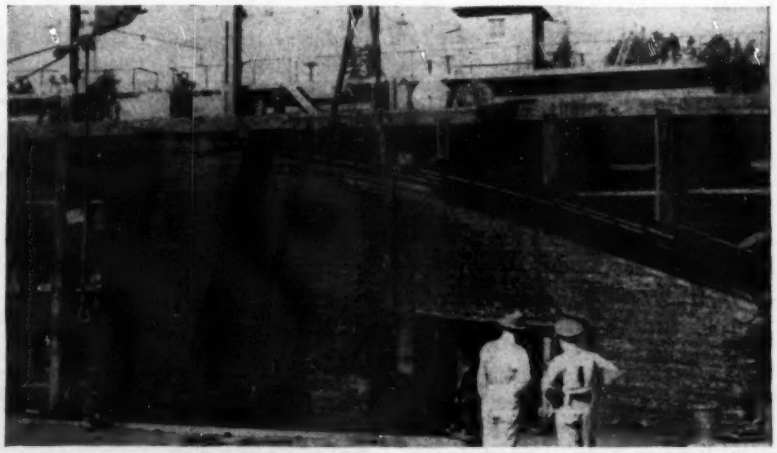


Fig. 2. Hoisting out the forward end of the deck that has been cut free by divers. (As seen from derrick barge deck.)

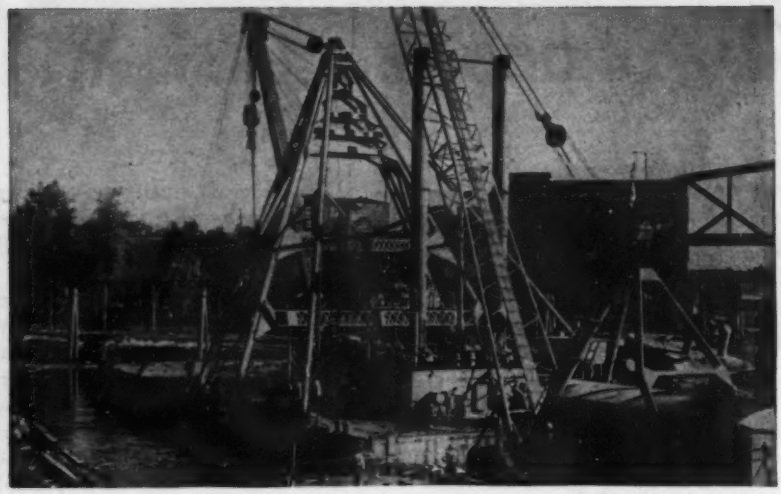


Fig. 3. Floating equipment moored alongside the overturned ship, which is partly visible at the extreme left. The derrick barge Cairo is in the background.

could be raised and loaded on barges.

Before cutting operations began metal of the hull was subjected to chemical analysis to make sure that it could be cut expeditiously by the torches. The material was found to be steel which cut very well. A factor in laying out the underwater cuts was the presence of a band of steel plates ¾ in. thick overlying the original hull plates along the water line, making the total thickness 1⅜ in. It was supposed that these plates had been put on for reinforcement against action of ice floes along a line where considerable hull deterioration had resulted, perhaps from corrosion while the vessel had been out of service and neglected.

During portions of the work, as when the accompanying pictures were made, the river stage had subsided to such a low level that one side of the vessel was exposed. This facilitated diving operations and also simplified the attachment of cables by which the pieces were lifted out as they were cut free.

Arrangements were made for sale of the salvaged material at a lump price of $2.27 per ton f.o.b. barge. The weight of the salvage would be determined, it was agreed, by submergence of the barges before and after loading. This plan of weighing included as pay tonnage *everything* lifted out except such water as would drain away.

Economy of the operation would depend largely on layout and supervision of the diving work, it was believed, and the responsibility for this was put in the hands of Capt. J. L. Tooker, who was loaned by the Navy for this job. Under his direction a crew of eight divers, working an average of 7 hr. per day, at the end of 60 days had removed approximately 2,100 tons of the estimated total of 4,000 tons. These men are paid $70 per day, the scale fixed by the union in the Portland area. Although the pieces varied widely in size, some were estimated to weigh as much as 160 tons.

As this is written, it is too early to give the complete costs of the job. It is estimated the work will be completed by the end of the year at a total cost of not to exceed $200,000. This cost includes labor, material, rental of equipment, and overhead. The largest item of equipment, the floating derrick barge *Cairo* with its crew of fifteen men, costs $400 per day.

The work is being accomplished by the Portland District, Corps of Engineers, U. S. Army, for which Col. Ralph A. Tudor is district engineer.

Giant Roller Compacts Subgrade On Runways for Heavy Bombers

ENORMOUSLY INCREASED LOADS on airplane runways, resultant from corresponding increases in the size of bombing planes, have led to a search by the Engineer Corps, U. S. Army, for quicker and better methods of compacting airstrip subgrades. By increasing the bearing capacity of the natural subgrade it is possible to so materially decrease the thickness of imported fill as to notably speed up the time of construction and decrease the cost.

For experimental work at a western location a sheepsfoot roller was built in an endeavor to greatly increase the 6-in. layer of material which is commonly regarded as the maximum that can be compacted at one time with ordinary equipment. The roller has a steel drum 8 ft. in diameter and 10 ft. in length. Gross net weight was 26,600 lb. Filled with water, the weight became 58,000 and filled with wet sand the gross weight was 77,000 lb.

Table I—Relative Compaction (Calif. Bearing Ratio percentages) Before and After Use of 8-Ft. Sheepsfoot Roller

Depth (Inches)	Before Rolling (CBR %)	After Rolling (CBR %)
18-24	80	95-101
12-18	70-80	90-102
6-12*	67-72	82-92

* For top 12 in. standard equipment is needed.

Table II—Relative Compaction (Calif. Bearing Ratio percentages) Before and After Use of Special Pneumatic Roller

Depth (Inches)	Before Rolling (CBR %)	After Rolling (CBR %)
0-6	80-83 (aver. 81)	84-101 (aver. 93)
6-12	75-89 (aver. 83)	89-91 (aver. 90)

As originally built there were 48 steel feet welded to the drum. These feet are 18 in. long with diamond-shaped pads 2½ x 5 in. in size at the contact surfaces. The first test indicated that 48 feet was an insufficient number and more were added, bringing the total up to 84. This was still too few and the number was increased to 156.

With 156 feet the number of trips necessary to produce the required compaction was greatly reduced and it was found that the roller, due to progressive compaction, would eventually "climb out" until the feet penetrated only about 6 in. At this stage of the work it was more economical to switch to the standard size sheeps-

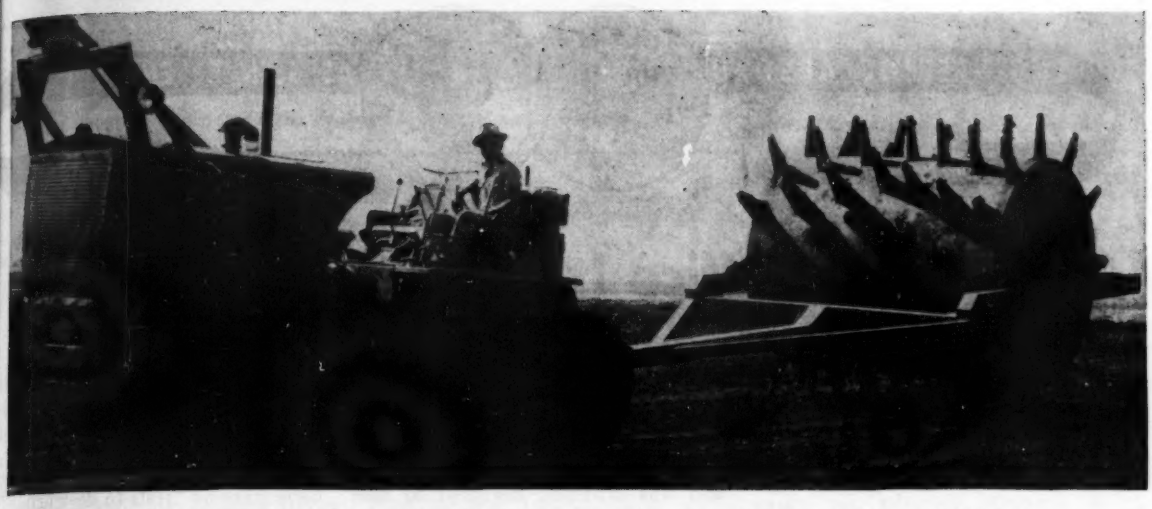


Fig. 1. Gross loads up to 77,000 lb. are used in this roller, which has a drum diameter of 8 ft. and 156 feet.

foot roller for compacting the upper 6 in., and then finally to finish off the surface with a heavy rubber-tired roller developed especially for this service.

Special type pneumatic roller used

For this surface compaction a pneumatic roller comparable to the petrolithic roller was developed. This consists of steel boxes bolted together with a supporting axle protruding from the side of each box. On the axles are mounted dual wheels, each carrying two 24 x 32-in., 36-ply pneumatic tires. An A-frame serves as a drawbar for connection to a tractor. The steel boxes are filled with any heavy material, preferably steel billets.

Rails can also be loaded on a deck, consisting of brackets with standards at the sides. When so ballasted the gross load of the roller has been as much as 170,000 lb. The feature of the roller design, which involves two boxes bolted together, was worked out with the idea that a third box could be set in between the other two, like the crossbar of the letter "H," making it possible to increase the space between wheels to a distance comparable to that of the tread of large bombing planes.

At a field where the natural soil forming the subgrade was a plastic clay or adobe it was desired to compact a considerable depth of the subgrade in place. The accompanying tables show the results, in this material, of compaction with the very large sheepsfoot and the pneumatic rollers. Comprehensive tests on other subgrade materials and with various combinations of loading and number of feet, it was pointed out, are still required to develop full efficiency of this equipment when used on other soils and under other conditions.

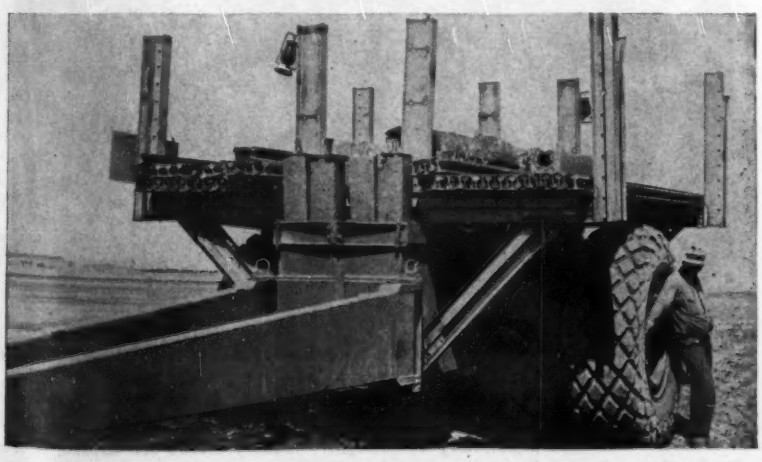


Fig. 2. This pneumatic roller works under gross loads of 170,000 lb. The dual tires are 24x82 in. and are 36 ply.

British City Plans Huge International Airport

Approval of preliminary designs for an air transport terminal with a capacity of 50,000 passengers a day has been given by the town council of Blackpool, a British resort town in Lancashire on the Irish Sea about 25 miles north of Liverpool. According to Sept. 15, 1944 issue of *The Engineer*, London, the area involved is between 5,000 and 6,000 acres on which three main "transoceanic" runways in triangular pattern will be laid out. Longest of these is to be 3 miles and capable of extension to 4½ miles, the projected width is 600 ft. Two secondary runways will each be 2 miles long and 450 ft. wide.

A novel feature is that within the area outlined by these three main runways a layout of three additional runways is planned to serve all intercontinental air transport. A seaplane base is planned close by.

The plans which have been submitted to the Air Ministry, were drawn by Guy Morgan & Partners, architects, and Brian H. Colquhoun, civil engineer.

The estimate of total cost, including the seaplane base, rail and highway connections and a hotel, approximates $125,000,000. It is said, however, that the scheme would be carried out in stages, the first of which would cost about $25,000,000.

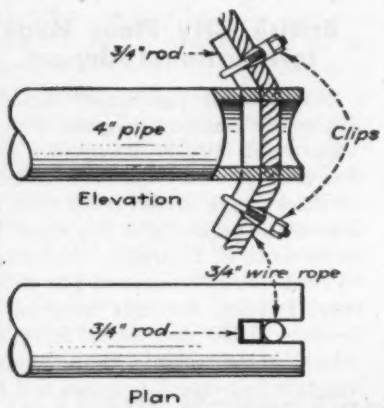
ENGINEERING ABROAD AS SEEN BY ENR EDITORS

Field and Office Items from the Pacific

N. A. Bowers
Pacific Coast Editor, Engineering News-Record

Cargo Sling Spreader

A job-made spreader for cargo slings used in unloading freight from vessels was designed by Seabees. The spreader is quickly put together from materials that should be available at any base. The main unit is a piece of



Details of rod and rope connections at end of spreader bar.

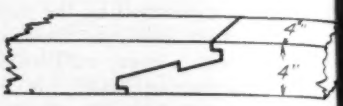
4-in. pipe whose length can be suited to the kind of cargo to be handled, but is usually made from 4 to 6 ft. long. A slot cut in each end of this pipe is fitted with a ¾-in. rod bent as shown. The rod is welded to the pipe and then wire rope clips are used to fasten the rod to the sling rope, this arrangement holding the spreader in the desired position.

Tension-Compression Joint In Timber Used by Japs

A "tricky" joint design for 4x4-in. timbers was extensively used by the Japanese in their hospitals on Majuro Island of the Marshall group. Each joint seemed to have been hand-fitted and was evidently designed to take both compression and tension in simple truss members where the stresses might be reversed. Although the several reversals in the direction of the necessary saw cuts make the joints seem complicated, the frequency with which they were used suggested that they were not difficult to make.

It is believed that the construction crew had a squad that was specialized in making these joints. By making the cuts slightly angular from one side or the other it would be possible to slip the two members together sidewise into a wedged fit.

As this particular Jap installation was taken without any bombardme there were no "tests to destruction" this joint. In fact, the structur



Sketch showing a tension-compressi timber joint in perspective.

framed with them are now being us by our own forces.

[Similar joints of even greater co plexity have been seen in timber stru tures in Peru; these too, were said t be of Japanese origin.—EDITOR]

JUNGLE SURVEYS in the Solomon Islands are carried on for the most part in the gloom of partial darkness even on bright days because the density of the cover is such as to exclude practically all sunlight. These pictures are unusual in showing jungle surveyors, for the moment at least, out in the sunshine. The jungle light conditions are suggested by the density of the shadows in the background.

Book Notes and Reviews

The month's addition to the engineer's reading and reference list

Our Engineers Abroad

BULLDOZERS COME FIRST—W. G. Bowman, N. A. Bowers, A. N. Carter, E. J. Cleary, Harold W. Richardson. 278 pp. McGraw-Hill Book Co., New York 18, N. Y. $2.75.

In a period extending from the late summer of 1942 to the early months of 1944, editors of *Engineering News-Record* traveled some 100,000 miles to report for the readers of this journal the activities of American engineers serving the military forces on far-flung battle fronts or on special missions in foreign fields in some way related to the nation's war effort. Reports from these editors were published currently in the pages of *Engineering News-Record* as soon as possible after they were released by the proper government authorities. Consequently they are scattered through many issues of the journal.

This book presents these reports rewritten in a much more convenient form. Thus assembled they give a clear and impressive picture of the part American engineers and construction men—and American construction equipment—are playing in the winning of World War II. Bulldozers, and the men who operate them are in the vanguard on many fronts.

Preparation of Tables

HANDBOOK OF TABULAR PRESENTATION—Roy Ovid Hall, 112 pp. Published by The Ronald Press Co., New York. $3.50.

Dedicated to the purpose of raising tabular presentation of facts and figures from an art to a science, this volume dissects statistical tables into components and assigns technical nomenclature to each part. Through before-and-after examples the author illustrates: 1. How to improve titles and captions so that they really define the table's purpose; 2. How to improve the organization of material by categories to make data more readily and directly useful; 3. How to set up the table visually to reduce monotony of appearance and bring out the significant relation of the figures used; 4. How to condense and eliminate irrelevant or unnecessary data. Engineers trained in a good college of engineering or a progressive engineer's office may be expected to practice these principles instinctively, but this volume should be useful in training typists and assistants who have not been subjected to such discipline in organizing, labeling and presenting tabular data. Also, wide acceptance and use of the order for tabulation of data as here recommended would lead to standard practice in position and form, which would facilitate accuracy and speed on the part of users.

Framed Structure Design

RAHMENFORMELN—Eighth Editon. By A. Kleinlogel. 460 pp. Published originally by Wilhelm Ernst & Sohn, Berlin, in 1939. Published in U. S. A. by Frederick Ungar Publishing Co., New York, under authority of the Alien Property Custodian. $7.50.

Since the appearance of its first edition more than twenty-five years ago, this compilation of frame formulas has more than doubled its size and has come to be a standard reference for the structural engineer who is too busy to analyze every frame he may be called upon to design. The eighth edition contains formulas for a total of 114 frames, many of which are new, although some appeared previously without a separate number. A few frames of earlier editions have been omitted, and the introductory and explanatory material of the appendix have been re-arranged and shortened.

STATICALLY INDETERMINATE STRUCTURES—By R. Gartner. 3 pp. Published by Concrete Publications Ltd. Westminster, S. W. I., England. Price 5s.

The author of this book confines himself to a discussion of the solution of statically indeterminate structures by the general method of deflections, supplemented by special procedures that involve special selection of the basic structure and the use of the elastic center as the point of application of redundants. A special method also is developed for the solution of frames, termed by the author the three-member equations, analogous to the three-moment equations. This application involves the use of successive partial loadings, for each of which only one point in the basic structure can deflect, as in the case of the use of fixed-points in continuous beams with single spans successively loaded.

The calculation of deflections by the integration $\int Mmdx$ is performed here by dividing moment diagrams into sections so that either M or m has a straight line variation. The integral for the section then equals the area of one diagram multiplied by the ordinate of the straight line diagram at the center of gravity of the first moment area. Another useful relation developed by the author is the approximate determination of possible error to aid in the best choice of redundants in the solution of an indeterminate structure. The presentation of the author is the opposite of that of American writers in that mathematics is left largely to speak for itself, the explanatory text being in many places minimized.

FUNDAMENTALS OF INDETERMINATE STRUCTURES—By Fred L. Plummer, 231 pp. Pitman Publishing Corp., New York 19. $4.

The writer on indeterminate structures frequently harbors an ulterior motive in that he wishes to extol the merits of a particular method of attack of which he is the author. Thus principal emphasis is laid on that method to the neglect or even exclusion of other methods which may be superior for certain of the problems considered. Such is not the case in this instance.

In this book the author has undertaken a general survey of the field of indeterminate analysis which should be of great value both to the student and the practicing engineer. Except for some few omissions, all of the current special methods for the solution of indeterminate structures, as well as the general method of deflections, have been included. The treatment throughout is necessarily brief; the presentation is simplied and, as the author states, long theoretical derivations have been largely avoided.

The types of structures for whose analysis the various methods are best adapted are pointed out. The value of the slope-deflection method and of the moment-distribution method in particular, however, in the solution

of secondary stress moments in trusses, is not mentioned. For the solution of frames with members of variable moment of inertia the author has included in the appendix a set of tables of coefficients that may be used in the application of all of the special methods of analysis. Reference also is made to charts giving directly for varying sections the values of the stiffness, carry-over, and fixed-end moment factors for use in moment-distribution which this reviewer considers more useful in the application of that method.

The format of this book is novel in that two columns appear on each page. This arrangement may have some advantages in appearance and economy in use of paper, but it has resulted in diagrams which are sometimes too small for clarity, especially where the constructions are complicated.—*Reviewed by* D. B. STEINMAN, *consulting engineer, New York.*

Mathematical Tables

MATHEMETICAL TABLES—Table 13, Circular and Hyperbolic Tangents and Cotangents for Radian Arguments, 412 pp.; Table 14, Bessel Functions $J_0(z)$ and $J_1(z)$ for Complex Arguments, 406 pp.; Table 15, Reciprocals of the Integers from 100,000 to 200,009, 204 pp.; and Table 16, Lagrangian Interpolation Coefficients, 309 pp. Prepared for the National Bureau of Standards and published by Columbia University Press, New York 27, N. Y. Each table $5 except Table 15, $4.

Table 13 to eight figures is useful to engineers because linear interpolation is ordinarily sufficient. The argument runs from 0 to 2 with intervals of .0001. This is helpful when a large number of values of one of the functions are needed quickly. Central differences are given when needed. If subtraction is involved in a formula one often needs several more digits to obtain even three or four-diget accuracy. In such cases a four-place table like J. W. Campbell's is not adequate.

Table 14 gives real and imaginary parts to ten decimals of $J_0(z)$, $J_1(z)$ for $z = \rho e^{i\theta}$ when $\rho = 0°, 5°, \ldots, 90°$ and $\rho = [0(.01)10]$. When cylindrical waves cause energy to dissipate either in the medium or at the boundary, Bessel functions of complex argument are encountered and this table is of use. Interpolation along a ray may be done with the table of five-point Lagrangian interpolants, pp. 383-403, to ten figures.

Table 15 to seven figures, extends the range of tables by Oakes or Cotsworth, which contain numbers under 100,000. One may bring any such number into the new range however: Multiply by a simple factor then later divide the reciprocal by it (or vice versa). Interpolation also extends the range to 10,000,000 or more.

Table 16 is a boon to all, especially those wishing to avoid in interpolation the use of differences (tedious to calculate when missing). The Lagrangian interpolation formula is destined to be used more and more. It involves only the tabular entries multiplied by the coefficients. For n-point polynomials when $n = 3, 4, \ldots, 11$ these are tabulated to ten decimals at smaller intervals than in previous tables. Adequate provision is made for interpolation near the beginning or end of a table. Inverse interpolation and analysis of the error in interpolation are included.

Important is the change in tables due to the universal use of the calculating machine. Each *now* supplements the other. Tables 13 and especially 14 and 16 recognize this.—*Reviewed by* CHESTER C. CAMP, *Professor of Mathematics, University of Nebraska, Lincoln, Neb.*

Building Code Data

NATIONAL FIRE CODES FOR BUILDING CONSTRUCTION AND EQUIPMENT—Robert S. Moulton, 512 pp. Published by National Fire Protection Association, Boston, Mass., 1944. $3.

To insure reasonable fire safety without prohibitive expense or unnecessary inconvenience, the National Fire Protection Association has prepared a book of standards as an authoritative guide for those engaged in buildings code writing or revision.

Compiled by Robert S. Moulton, technical secretary of the association, the contents of this book include: a building-exits code; standards for restricting the spread of fire; good practice for chimneys and smoke pipes; standards for building equipment and building details; occupancy standards; good practice requirements for construction operations; and fire tests.

Although the codes are advisory as far as the N.F.P.A. is concerned, they are intended as a basis of law, as a guide for administrative authorities and for insurance purposes.

A Portrait of TVA

THE VALLEY AND ITS PEOPLE—By R. L. Duffus and Charles Krutch. 167 pp. Published by Alfred A. Knopf, New York. $2.75.

A brief text written by a *New York Times* editor combined with an excellent selection of nearly one hundred photographs taken by the graphics department of the Tennessee Valley Authority make a quickly readable account of the accomplishments of the TVA. Both the text and the selection of pictures are enthusiastically pro TVA. They give a strictly non-technical record of the development in the valley, briefly for the period prior to 1933, and in some detail since the advent of the Tennessee Valley Authority.

New Engineering Books

ESTIMATING BUILDING COSTS—Third Edition. By Charles F. Dingman. 401 pp. McGraw-Hill Book Co., New York 18. $3.

STREAM SANITATION—By Earle B. Phelps. 276 pp. John Wiley & Sons, New York. 16. $3.25.

NEW ARCHITECTURE AND CITY PLANNING—By Paul Zucker. 694 pp. Philosophical Library, New York. $10.

OCCUPATIONAL ACCIDENT PREVENTION—By Harry H. Judson and James M. Brown. 234 pp. John Wiley & Sons, New York. 16. $2.75.

THE FISKE PLAN for Free Enterprise and Post-War Employment—By Lt. Edward R. Fiske, U.S.N.R. 190 pp. The Christopher Publishing House, Boston. $2.25.

DESCRIPTIVE GEOMETRY FOR ARCHITECTS & BUILDERS—By Leslie A. Lee and R. Fraser Reekie. 224 pp. Edward Arnold & Co., London.

THE COMING AIR AGE—By Reginald M. Cleveland and Leslie E. Neville. 359 pp. McGraw-Hill Book Co., New York 18. $2.75.

AERODYNAMICS—By L. R. Parkinson. 112 pp. The Macmillan Co., New York. $2.25.

CIVIL AVIATION AND PEACE—By J. Parker Van Zandt. 157 pp. Vol. II of a series under the general title "America Faces the Air Age." The Brookings Institution, Washington 6, D. C., $1.

AIRPORT ENGINEERING—By H. Oakley Sharp, G. Reed Shaw, and John A. Dunlop. 150 pp. John Wiley & Sons, New York; Chapman & Hall, Limited, London. $5.

CALCULO DE CONCRETO ARMADO—By Telemaco van Langendonck. Associacao Brasileira de Cimento Portland, Sao Paulo, Brazil.

(*Continued on page* 144)

THE FAR EAST

Frontier for American Enterprise

IN THE great tradition of America, our frontier lies to the West. But for a United States that stretches from the Atlantic to the Pacific, to Go West is to arrive in the Far East. The feet of literally millions of our young men are now set upon that route.

Accomplishment of their objective—the defeat of Japan—will not end our responsibilities to the Orient any more than the defeat of Germany will end our responsibilities to Europe. This time we mean to see the venture through.

The first sketch of a political program for enlisting the strength of nations of good will to enforce the peace was drawn at Dumbarton Oaks. That is a good start. But those who participated know how much work remains before the blueprint becomes a fully matured plan, the plan becomes a structure, and the structure takes life and effective being in the living imagination and will of the peoples of the world.

No political accord, however high its purpose, can endure for long if it depends upon the loyalty and support of populations embittered by hopeless poverty that is offered no promise of relief. The poisonous dust of mass despair makes inevitable an ultimate explosion, whether it be sparked by a torch supplied from without or by its own internally generated heat. Much of the Far East is sufficiently close to that position to pose a grave problem to the Western world. It is of particular importance that American business men and workers alike recognize the nature of their responsibility in the matter, for to them the great area of the East presents also an opportunity and a challenge.

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The Orient—stretching in a vast semicircle from Manchuria and Japan to India and Ceylon—is the home of more than a billion people, the world's greatest potential market. In its mountains are the earth's richest stores of tin and mica; its deposits of iron ore, coal, and manganese rival those of France, Russia, and the United States. Its rice paddies are the most productive in the world, its coconut and rubber plantations the largest, and its cotton production is of major volume.

And yet, this fabulous region—with its riches of manpower and raw materials—suffers from living standards at the lowest rung of the world scale. With as much as 85 per cent of the populations of this great area devoted to the production of farm products, starvation has been an endemic plague to countless millions of its inhabitants, and will remain so until they graduate from the crudely primitive methods of the crooked stick and the bamboo plow to the use of the implements of a modern world in both agriculture and industry.

The improvement of agricultural methods and the burgeoning of industrial development depends upon tools—a preponderance of simple tools, no doubt, at the beginning, for modernization of economic processes is a development that cannot be forced at a rate faster than the ideas upon which they depend can be developed. If we, in the United States, are to hope to supply a major portion of the implements upon which the salvation of the East depends, we must be prepared to export also the skills and technologies which will make their effective use possible.

The possibility of a world market for machinery and manufactured products is a challenge that American industry cannot afford to ignore. The United States will emerge from the war with almost half of the world's industrial capacity within its borders, with much more than half of the heavy industries. Drastic and painful readjustments are inevitable; but they can be mitigated to the extent that we can find outside markets for the products for which we have excess capacity.

We shall find ourselves, at war's end, in a singularly favored position to compete in any equipment markets which are open. It is not merely that we shall have the productive capacities crying for outlets. Aside from Germany and Japan, which for some time will not be in a position to compete, our two major industrial Allies, Great Britain and Russia, will face enormous tasks in providing for their own rehabilitation. Neither of them is likely to be in a position to export more capital than they absorb; and although Canada, Sweden, and Switzerland will be, the United States will stand alone as the one major creditor nation in the world. If the potential advantages of this position are managed with wisdom and imagination, they will enormously enhance our opportunities for supplying a great share of the capital goods demand of undeveloped areas.

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What is the dimension of the Far East's potential demand? What are some of the difficulties standing in the way of its being realized?

If needs were the only measuring stick, the Far Eastern market would provide a bottomless pit into which even the great stores of our exportable capacity could be poured with room to spare.

China, alone, with its teeming population of 450 millions, has spelled out needs in dimensions large enough to stir the imaginations of the equipment producers of the world.

Business Week (February 5, 1944) supplements Dr. Sun Yat-Sen's spacious first estimates of the requirements for a thorough-going industrialization program with figures provided by current Chinese planners—25,000 locomotives; 300,000 freight cars; 20,000 passenger coaches; 20,000,000 tons of steel; and 90,000 power driven machine tools for the first five years of reconstruction. An American manufacturer of farm equipment, who recently surveyed the agricultural requirements of China, estimates an ultimate Chinese market for 20,000,000 tractors.

India's drawing-board plans are equally expansive. According to the bold pattern drawn up by a group of Bombay industrialists—some of whom are due to visit the United States early in 1945—India, after the war, will require a capital investment of $2,000,000,000 a year over the next 15 years, of which $250,000,000 per year for the first seven years will be in the form of imported capital goods.

Included on the huge import order list of the Bombay executives are mining, roadbuilding and power station equipment, heavy locomotives, metallurgical plants, agricultural machinery, and a long list of machine tools.

There can be no question of the need of these countries for the industrial equipment—and for many items of manufactured goods—which we are so eminently in a position to supply. But realism requires that we measure this demand against the Far East's probable capacity in the relatively near future to absorb industrial goods.

A Chinese economist has estimated that China, in 1937, had a total industrial capital investment of about $1,000,000,000 in American values, or something like $2.50 per capita of population. In contrast, the American investment, in manufacturing facilities alone, is now more than $600 per capita.

What it could mean in terms of capital goods requirements if China alone carries out this dream of modernizing, not to the utopian level of the United States but to the present modest level of the less developed Soviet Union, is typified by measuring just three lines: 500,000 tons of steel a

year, for five years, to add 12,500 miles to the railroad system; 2,187,500 motor vehicles; 3,300,000 telephones.

But it is one thing to cite mountainous figures demonstrating needs. It is another, and far less optimistic exercise, to find assurance that practical opportunities for satisfying such needs can be made to materialize. Let us face some of the major difficulties and see if they are insurmountable.

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The first hurdle to be cleared is the question of whether or not we want to promote the industrialization of the Far East. The wisdom of doing so has been vigorously challenged. The negative argument, on the economic side, generally runs thus: If we provide industrial equipment to backward economic areas, we deprive ourselves of the greater long-run opportunity of selling them manufactured articles which our aid has enabled them to produce for themselves.

It is only fair to say that such a thing might happen—that it has happened in isolated instances in the past. But the overwhelming weight of economic history demonstrates that the broader attitude is also the profitable one.

The United States itself is the living refutation of the fear which now cramps the outlook of many of its own citizens.

From 1790 until 1850 the foreign trade of our new fledged Nation had many of the characteristics which pertain to the trades of China and India today. We imported manufactures and we exported raw materials, agricultural products, and newly mined gold. Our imports exceeded exports, the difference being made up partly by payments to us for shipping services and partly by industrial development loans. It is relevant to inquire how the trade of the lenders was affected by this policy of supplying us with industrial capital and machinery.

From 1850 through 1939 the pattern of America's foreign trade changed. Slowly at first, and then at accelerated pace, our import ledger showed a percentage decline in manufactured goods and a percentage rise in raw materials to feed our expanding industrial facilities. But while finished manufactures declined percentagewise in our import budget, so great was the increase in our total foreign trade operations in the century from 1830 to 1930 that our imports of manufactured goods increased more than twentyfold, and they more than doubled between 1900 and 1939.

Clearly industrial Europe gained rather than suffered from the industrialization of the United States, and it is equally clear that we, in turn, shall benefit from the industrialization of the world's undeveloped territories. Further evidence is provided by Canada which, with its high industrial development but only 12 million people, buys from us each year almost as much as the relatively unindustrialized 130 million people south of the Rio Grande.

If it be granted, as I believe it must, that the development of Far Eastern countries will be to our advantage as well as theirs, the second question that we should face is the speed with which it can be accomplished. Is there genuine promise in the proximate future of opportunities for American enterprise of the magnitude set forth in the estimates quoted above?

In all fairness, I am forced to state my conviction that the road is longer than is indicated by Chinese and Indian leaders. It is natural, and far from censurable, that their eyes should be focussed upon the urgency of national needs, rather than upon obstacles in the way of their fulfillment.

On the other hand, it is possible that our own long process of industrialization may lead us to conclusions of undue conservatism. Ideas, once they break the crust of resistance are the most contagious of bacteria, and the tempo of their infiltration seems to increase by geometrical progression in a world of swift communication.

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In an interesting recent study of The International Labor Office, it is suggested that the general economic level of the rest of Asia outside Japan in the late 1930's was not dissimilar to that of Japan in 1900. Between 1900 and 1936, Japan increased its total capital investment more than threefold devoting between 10 and 17 per cent of its annual income to capital outlays. A comparable tempo of development for China, India, and other Asiatic areas would result in a capital expansion that would dwarf to insignificance the most optimistic blueprints that have been put forth to date. I am not suggesting this as a likely possibility, but rather as a caution lest we, in the name of hard-headed realism, underestimate Asiatic potentials as much as their own nationals exaggerate them.

Finally, in appraising the outlook for American enterprise in Far Eastern markets, we collide, head-on, with the problem of how we are to be paid. Here, hard-headedness can be only a virtue, for the lack of it will breed inevitable disaster for the Asiatics as well as for us.

In the last analysis, the dimension of the American market in the Far Eastern countries will be determined by the dollar exchange at their command, obtained through the products, goods, and services which they are able to provide to us, with due allowance for multilateral trade arrangements. It is true that the balance temporarily can be distorted through the extension of developmental loans. There is little question but that such loans will be in order after the war, and if they are wisely made, for productive projects that eventually will increase the exporting capacities of the countries to which they are extended, they can be thoroughly justified. But the best loans provide only a temporary expedient. In the long run, the balance of current payments must be restored with sufficient margin to provide interest payments and finally amortization of principal.

☆ ☆ ☆

How, then, are we to attack the problem of increasing our imports from the Orient?

In 1937, the total exports of the Far East amounted to something over $5,000,000,000—a little less than $1,500,000,000 in foodstuffs, a little more than $2,500,000,000 in raw and partly manufactured materials, and better than $1,000,000,000 of manufactured articles. Of this total, the United States purchased only about 20 per cent—approximately 10 per cent each of the foodstuffs and manufactures, and 30 per cent of the materials.

Despite changes in our technologies which will probably reduce our future takings of such important items as rubber and silk, the achievement of a high level of economic activity in this country after the war will provide a basis for increasing our Eastern imports, but only if it is an accepted part of our national policy to do so.

This means an alert and aggressive exploration of two-way trade possibilities on the part of both American business and our governmental agencies. It cannot be done by either alone.

The war has dislocated many of the trade patterns that prevailed in the past. The East is hungry for the type of products which we, uniquely, are situated to supply, but it will make its bargains with those who will not only fill its needs but will also provide outlets for its produce. Even the prewar magnitude of the exports from this area provides ample margin for the most meticulous and imaginative shopping of Eastern markets with the aim of increasing the modest share of our prewar purchases. And a farsighted program of development loans can greatly increase the capacity of these countries to produce what we want.

In general, we can trust American enterprise to explore rigorously all likely export opportunities. But the equally vigorous investigation of import possibilities will require a break from past traditions on the part of American business and American government.

Both East and West must learn to think in new patterns for the successful opening of a new frontier.

James H. McGraw, Jr.

President McGraw-Hill Publishing Co., Inc.

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CONTRACT UNIT PRICES

What contractors are bidding on different kinds of construction work

PAVING RUNWAYS, IDLEWILD AIRPORT, N. Y.

OWNER: City of New York, Dept. of Marine and Aviation; Jay Downer, consulting engineer, and Wharton Green, associate engineer.

PROJECT: Paving of runways A, B and C with cement concrete pavement of 12-in. uniform thickness. Runway A to be 10,000-ft. long by 200-ft. wide; Runway B, 7,500-ft. by 200-ft.; and Runway C, 8,200-ft. by 200-ft. It is stipulated that 600,000 sq. yd. of Runway A must be laid in 1944 season, forming full width section at least 1000-ft. long. Grading item includes all excavation for pavement and underslabs, disposal of excavated material, forming and trimming all shoulders, maintenance, and preparation of fine grade.

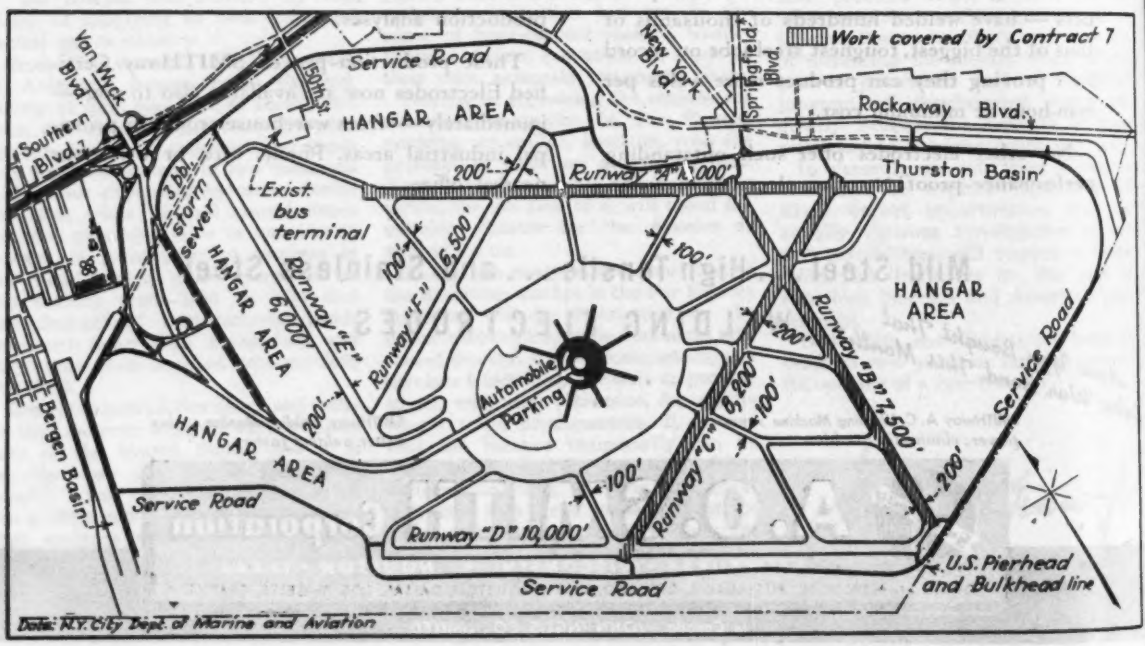
CONDITIONS: Contractor to furnish all materials and complete work in 330 consecutive calendar days. Project has AA-3 priority rating. Other contracts may be carried on at the same time, and care must be exercised to avoid interference with other work. Rail, highway and water transportation facilities available at or near site of work. Wage rates are: skilled labor, $1.60 to $2.25 per hour; semi-skilled, $1.00 to $1.62½; common, 95c.; and pipelayers (unskilled), $1.50.

BIDS: Twenty-four bids were received September 21, 1944, ranging from the contract low of $2,203,945 to $3,755,384. Estimated cost, $2,700,000. (Contract 7).

LIST OF BIDDERS:

1. A. I. Savin Constr. Co., East Hartford, Conn. (contract) — $2,203,945
2. L. G. DeFelice & Son, Inc., New Haven, and Andrew Gull, Brooklyn, N. Y. — 2,229,559
3. Sicilian Asphalt Paving Co., New York, N. Y. — 2,369,912
4. Arute Bros., Inc., Rochester, N. Y. — 2,450,340
5. Woodcrest Constr. Co., and Gould & Kress, New York, N. Y. — 2,466,250
6. Garofano Constr. Co., Inc., New York, N. Y. and Mt. Vernon Contr. Corp. Mt. Vernon, N. Y. — 2,467,435
7. Del Balso Constr. Corp., and Rusciano & Son Corp., New York, N. Y. — 2,473,435
8. Tully & DiNapoli, Inc., Long Island City, N. Y. — 2,492,090
9. Gahagan Constr. Corp., New York, N. Y. — 2,497,843
10. Grandview Co., Mount Vernon, N. Y. — 2,538,686
11. Tufano Contract. Corp., Jamaica, and Charles F. Vachris, Brooklyn, N. Y. — 2,539,201
12. Standard Bithulithic Co., New York, N. Y. and Warren Bros. Roads Co., Cambridge, Mass. — 2,628,206
13. D. V. Frione Co., Inc., New Haven, Conn. — 2,643,611
14. Union Paving Co., Philadelphia, Pa. — 2,650,316
15. Arthur A. Johnson Corp. & Necaro Co., Inc., Long Island City, N. Y. — 2,691,000
16. Bero Engr. & Constr. Corp., Buffalo, N. Y. — 2,701,432
17. Davis Constr. Co., Hicksville, N. Y.; Edward Acker Co., Setauket, N. Y.; and Tuckahoe Constr. Co., Inc., Tuckahoe, N. Y. — 2,701,764
18. Louis Mayersohn, Albany, N. Y. — 2,722,573
19. B. Perini & Sons, Inc., Framingham, Mass. — 2,768,969
20. Johnson, Drake & Piper, Inc., New York, N. Y. — 2,777,050
21. W. L. Johnson Constr. Co. and Associates, Hicksville, Ohio — 2,794,080
22. Andrew Weston Co., Inc., Woodmere, N. Y. and Good Roads Engr. & Contracting Co., Inc., Wantagh, N. Y. — 2,858,800
23. Tripp Constr. Co.; Arthur Venneri Co.; and Zara Contracting Co., Hewlett, N. Y. — 2,914,740
24. S. J. Groves & Sons Co., Ridgefield, N. J., and Union Building & Constr. Corp., Passaic, N. J. — 3,755,384

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Grading	570,000 s. y.	$0.10	$0.10	$0.08
2. High Early Strength Portland cement	12,500 bbl.	2.73	3.15	2.62
3. Natural cement	51,000 bbl.	2.60	2.80	2.71
4. Portland cement	310,000 bbl.	2.25	2.28	2.20
5. Cement concrete pavement	190,000 c. y.	5.70	5.70	6.44
6. First class concrete (1:2:4)	350 c. y.	25.00	15.00	19.00
7. Calcium chloride	50,000 lb.	.03	.03	.11
8. Metal reinforcement for conc. pavmt.	570,000 s. y.	.23	.25	.25
9. Expansion joint material	48,800 l. f.	.40	.43	.38
10. Bar reinforcement for structures	73,000 lb.	.05	.05	.06
11. Joint supports, Type A	4,000 ea.	1.20	.50	.38
12. Joint supports, Type B	4,000 ea.	2.00	1.75	1.75
13. Joint supports, Type C	4,000 ea.	1.20	1.95	1.66
14. Joint supports, Type D	4,000 ea.	1.20	.55	.54
15. Electrical conduit, 3-in. diameter	10,000 l. f.	.80	2.00	.38
16. Load tests	12 ea.	400.00	250.00	442.00



FOR THOSE Tough DRILLING JOBS!

THE SULLIVAN UNIVERSAL WAGON DRILL

Every construction man knows that a difficult drilling job can tie up an entire project and throw the complete schedule off. It's that kind of a drilling job that's made to order for the Sullivan Universal, a mediumweight rig that takes the tough jobs right in stride.

The Sullivan Universal has four exclusive features that will help you finish your tough jobs on time and will do it at lower cost. Check these features now; see how they can mean more footage drilled per shift and lower upkeep costs. Then, be sure your next wagon drill has every one of these outstanding features:

BRAKES—Make moving quicker and easier and reduces setup time. Increases footage per shift because more time is allowed for actual drilling.

"A" FRAME—Braced support of "A" frame insures rigid support at all drilling positions. Result: Fewer broken steels.

HYDRAULIC CONTROL—Permits quick easy positioning of drill and feed. Hydraulic lift can move drill, feed and supporting arm from ground level to 6 feet in the air. No worm gears, cranks or hand operated hoists are necessary.

SULLIVAN "PISTONMOTOR" FEED—Especially designed for rock drills only. Efficient controls permit quick retraction of drill steel for any variation of speed and pressure.

Bulletin 87-T-1 describes these, and additional features in detail. Write to the nearest Sullivan office for your copy. Sullivan Machinery Co., Michigan City, Ind. IN CANADA: Canadian Sullivan Machinery Co., Ltd., Dundas, Ontario.

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CONTRACTORS' EQUIPMENT PROVED THE WORLD OVER

FACTORIES: MICHIGAN CITY, IND. CLAREMONT, N. H.

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PRODUCTS: Portable Compressors • Stationary Compressors • Rock Drills • Wagon Drills • Core Drills • Portable Hoists • Spaders • Paving Breakers • Trench Diggers • Sheeting Drivers • and other Pneumatic Tools.

MATERIALS AND LABOR PRICES

Market quotations on construction materials and wage rates reported monthly by ENR correspondents

CONSTRUCTION MATERIAL prices and labor rates reveal major changes in vitrified sewer pipe, clay drain tile, brick, and common labor in December. Vitrified sewer pipe prices are up in Detroit, New Orleans, Philadelphia, St. Louis and Seattle. Clay drain tile is higher in Boston, Detroit, Philadelphia and St. Louis. Common brick prices increased in Cincinnati, Dallas, Detroit, Minneapolis and St. Louis.

Common labor on building construction increased 7½c. per hour in Kansas City; and common labor on heavy construction increased 5c. per hour in New York and 4½c. in Seattle. In Detroit, the hoisting engineers' rate, formerly $1.675 to $1.75 per hour, now ranges from $1.675 to $1.825. The hoisting engineers' hourly rate and the plasterers' rate are each up 5c. per hour in Kansas City.

Prices for aggregate, ready-mixed concrete, paving asphalt, and iron and steel products remain at November levels. Southern pine lumber prices are unchanged from a month ago, but Douglas fir is up $1.75 to $16.50 per M ft., b.m. in Seattle. Cement prices in San Francisco and Los Angeles dropped 20c. per barrel.

CEMENT, AGGREGATE, READY-MIXED CONCRETE—F.O.B. CITY

	PORTLAND CEMENT — Per bbl., C/L lots, incl. 40c. per bbl. for bags, cash dis. not deducted: Cloth *a*	Paper	Bulk	SAND AND GRAVEL — Per ton, carload lots: Gravel, 1½ in.	Gravel, ¾ in.	Sand	CRUSHED STONE — Per ton, carload lots: 1½ in.	¾ in.	CRUSHED SLAG — Per ton, carload lots, f.o.b. plant: 1½ in.	¾ in.	CONCRETE BLOCK 8x8x16-in.; truckload del.; per block: Sand-grav.	Lt.wgt. Agg.	CONCRETE Ready Mixed 1:2:4, over 50 c.y., del.
Atlanta	$2.77	$2.52	$2.47	$1.79	$1.89	$1.99	$1.79	$1.89	$1.59	$1.69	$0.17	....	$8.00
Baltimore	2.53	2.28	2.03	1.75‡	1.75‡	1.25‡	1.75‡	1.75‡	1.75‡	1.75‡	.125	$0.125*w*	7.35
Birmingham	2.50	2.25	2.10	1.75	1.75	1.50	.85	1.00	.90	1.15	.1425	....	5.80
Boston	2.97*b*	2.72*b*	2.52	1.50‡	1.50‡	1.05‡	1.25‡	1.35‡	....	....	.13	.155*w*	7.55*m*
Chicago	2.70	2.45	2.30	2.15‡*d*	2.15‡*d*	2.15‡*d*	2.15‡*d*	2.15‡*d*	1.75‡	1.75‡	.16	.16*x*	....
Cincinnati	2.41	2.16	1.91	1.20	1.20	1.10	1.80	1.80	....	....	.12	.15*w*	6.70
Cleveland	2.49	2.24	....	1.75*i*	1.75*i*	1.55*i*	1.80*i*	1.80*i*	1.73*i*	1.73*i*	.14	.14	7.45
Dallas	2.52	2.27	2.07	1.50*p*	1.70*p*	1.10*p*	1.69*p*	1.79*p*	....	....	.15	....	6.20
Denver	3.08	2.88	2.32	1.20	1.30	1.25	1.65	1.75	1.00	1.00	.15	....	7.25
Detroit	2.49	2.24	2.09	1.50	1.50	1.50	2.25	2.25	2.00‡	2.00‡	.13	.14*w*	7.15
Kansas City	2.58	2.33	2.18	1.85	2.30	1.00	1.91	1.91	....	....	.125	.125*wy*	7.50*n*
Los Angeles	2.80*e*	2.20*e*	....	1.30	1.30	1.15	1.30*f*	1.30*f*	....	....	.0466	.10*aa*	7.25
Minneapolis	2.90	2.65	....	1.00*h*	1.00*h*	.25*h*	1.00*h*	1.00*h*	....	....	.12	.16	7.35*j*
Montreal	....	1.95*rs*	1.79*rs*	1.65‡*s*	1.65‡*s*	1.50*t*	.80*ct*	.90*ct*	....	....	.14*t*	.14*wt*	7.85*u*
New Orleans	2.42	2.16*dd*	1.96	1.67	1.65	1.22	....	....	....	....	.19	....	9.25
New York	2.85‡	2.60‡	....	1.60*de*	1.60*de*	.90*de*	1.70*de*	1.80*de*	....	....	.16	.14*wcc*	7.50*k*
Philadelphia	2.73	2.48	2.23	1.55‡	1.65‡	1.20‡	1.90	1.95	1.10	1.10	.155	.155*w*	8.45
Pittsburgh	2.55	2.30	2.10	1.65‡	1.65‡	1.85*dd*‡	2.25‡	2.25‡	1.50	1.50	.17	.17*z*	8.25
St. Louis	2.80	2.52	....	1.75‡	1.75‡	1.25/1.50‡	1.10*h*	1.10*h*	.75*g*	.75*g*	.145	.13*w*	8.00
San Francisco	....*u*	2.01	1.71	1.36	1.36	1.36	1.46	1.46	....	....	....	.20*y*	7.35
Seattle	2.95*e*	2.75*e*	....	1.00*e*	1.00*e*	1.00*e*	2.00*e*	2.00*e*	....	....	.16	.16*y*	7.25

‡ Delivered. *a* 10c. allowed for each returnable bag *b* 10c. per bbl. off for cash. *c* F.o.b. quarry. *d* Per cu. yd. *e* Barge lots alongside docks. *f* Crushed granite. *g* F.o.b. Granite City, Ill. *h* F.o.b. plant. *i* Within three miles of Public Square. *j* 5% discount for cash. *k* Discount of 2 percent for cash in 10 days. *l* Up to 200 cu. yd. *m* 50c. off for cash. *n* 25 c.y. or more. *o* 2% off for cash. *p* 10c. per ton off, cash 15 days. *r* 10c. per bbl. off, cash 20 days. *s* 8% sales tax included. *t* 8% sales tax not included. *u* Price withdrawn. *v* 20c. per bbl. discount; 20c. allowed for returnable cloth bag. *w* Cinder. *x* Waylite. *y* Haydite. *z* Celocrete. *aa* Pumice. *bb* 4 x 8 x 12 in. *cc* Also 8 x 18 x 18 in. *dd* November, 1944 price.

CASH DISCOUNTS CEMENT to Contractors: truck delivery, 2% for cash on 10th of month; on carload deliveries, no trucking, same as dealer cash discount 10c. per bbl. for payment withie 15 days of date of invoice. Subject discount 10c. per bbl. 20 days in Montreal.

CURRENT MAXIMUM PRICE BASES AT CEMENT MILL

Charge for bags not included. For cloth bags, add 40c. per bbl.; 10c. refund allowed for each returnable bag; for paper bags add 15c. per bbl., not refundable.

	Bagged	Bulk		Bagged	Bulk		Bagged	Bulk
Buffington, Ind.	$1.70	$1.65	Ironton, Ohio	$1.70	$1.65	Richard City, Tenn.	$1.80	$1.75
Dallas, Tex.	....	....	Limedale, Ind.	....	....	Steelton, Minn.	1.80	1.75
Hannibal, Mo.	1.70	1.65	Norfolk, Va.	....	....	Universal, Pa.	1.75	1.70
Hudson, N. Y.	....	....	Northampton, Pa.	1.75	1.70	Waco, Tex. (Plus 9c. tax in Tex.)	1.75	1.70
Independence, Kans.	1.70	1.65	North Birmingham, Ala.	....	....	Montreal (8% sales tax incl.)	1.68	1.67
						Discount 10c. per bbl. 20 days		

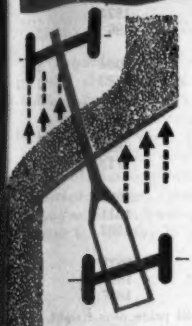
PAVING BRICK, BLOCK, ASPHALT, ROAD OILS—F.O.B. CITY

	PAVING BRICK AND BLOCK — Granite per M. lots of 50,000 4x4x8 in.	Brick per M 3x4x8½ in carload lots	Wood per sq. yd. 3½ in. 16-lb. treat	PAVING ASPHALT — Per ton, less than 80 penetration: Tank car	Drums	ASPHALT BINDERS—FLUXES — Per gal., 80–300 penetration: Tank car	Drums	CUTBACK ASPHALT — Per ton: Tank car	Drums	ROAD OIL — Per gal.: Tank car	ASPHALT EMULSION (Quick-breaking) Per gal.: Tank car	Drums
Atlanta	$73.00	$39.35	$2.25	$18.53*c*	$24.62*c*	$0.0740*c*	$0.1309*c*	$0.0802*hc*	$0.1348*h*	$0.0676*c*	$0.0826	$0.1384
Baltimore	150.00‡	49.00	82.50*m*	15.00*r*	21.00*r*	.06*r*	.09*r*	13.00*r*	23.00*r*	.065*r*	.07*g*	.14*r*
Birmingham	150.00	48.00	.....	17.95	.....†	.0747	.....†	.0834*h*	.....†	.065	.09	.....†
Boston	85.00	59.00	3.75	17.00	24.00	.20	.22	25.00	30.00	....	.1125	.1325
Chicago	150.00	55.00	2.50/2.80*d*	14.00	22.50	13.00*g*	21.50*g*	.0575*h*	.15*h*	.05*n*	.09/10*n*	.13/.15*n*
Cincinnati	120.00	53.75	.....	17.00	.....	.085	.....	12.25	.....	.07	.085	.....
Cleveland	118.00	37.25	2.50	16.00	18.00	.085	.095	.10*h*	.....	.095	.095	.....
Dallas	.....	36.00	.....	13.65	20.30	.06	.11	16.00	24.80	.06	.05/.07	.07/.09
Denver	.....	16.11	.....	11.00	.....†	10.00	.....	.045*h*	.....	.....	.....	.....
Detroit	.....	37.00	.....	18.00*f*	25.60*f*	.0743	.128	.0718*h*	.119*h*	.067	.0775	.1149
Kansas City	.....	40.00	.....	18.50	23.50	.077	.1075	.077*h*	.107*h*	.057	.11	.15
Los Angeles	.....	50.00	.....	9.00*b*	23.00	9.50*bg*	24.00*bg*	9.50*b*	.....	.025	.072	.15
Minneapolis	.....	.....	2.30*d*	.....	27.70	.....	.126	.....	32.64	.....	.....	.....
Montreal	92.40	.....	.....	16.60*k*	24.25*k*	.116*k*	.1485*k*	.115*hk*	.135*hk*	.08*k*	.135*k*	.188*k*
New Orleans	.....	.....	.....	13.50*a*	20.00*a*	.057	.088	.06*h*	.095*h*	.....	.080	.....
New York	.....	65.00	.....	17.40	24.20*p*	14.00	.....	.0725*h*	.1325*hp*	.....	.0725*p*	.119*p*
Philadelphia	140.00	58.00	4.06	15.00*r*	.....	14.00*r*	.....	.0625*h*	.....	.....	14.00*gr*	.....
Pittsburgh	135.00	38.75	.....	18.00	23.00	.09	.16	20.00	36.00	.07	.06	.11
St. Louis	.....	39.00	.....	16.00	22.00	15.00*g*	21.00*g*	.0575*h*	.1212*h*	.048	.06	.11
San Francisco	.....	40.00	.....	10.90	21.15	10.90*g*	18.00*gr*	12.90	17.50*r*	9.50*gr*	.0525	.1125
Seattle	.....	.....	.....	10.90*i*	23.40*i*	.....	20.40*gi*	11.40*i*	.....	.....	.0525*i*	.0625

‡ Delivered. *a* F.o.b. Baton Rouge. *b* Delivered to purchaser's warehouse. *c* 3½x4x8½ in. *d* 2½ in. 12-lb. treatment. *e* Local reduction due to 20% reduction intra-state class freight rates, only Georgia affected. *f* Mexican. *g* Per ton. *h* Per gallon. *i* F.o.b. Martinez. *j* 3x3½x8½ in. *k* Tax included. *m* Per thousand. † Available on priority only and quoted specially. *p* No steel drum shipments except to armed forces. *r* February 1943 prices, none later available.

"CONTROLLED TRACTION"

. . . moves more material . . . farther and faster



This "99-M" is using "Controlled Traction" to move the material up the slope; an operation always difficult, and frequently impossible, for ordinary Motor Graders.

This "99-M" is using "Controlled Traction" to move a tremendous windrow of "oil mix" along the entire 13 ft. blade, and miss the windrow with all wheels.

• Getting down to fundamentals, the main job of any self-propelled grader is *to move a satisfactory amount of material with the blade, and at the same time keep moving in the desired direction.*

CONTROLLED TRACTION involves steering the rear wheels, and angling the frame, until the combination of rear wheels pushing behind the toe of the blade, front wheels pulling ahead of the heel of the blade, and blade practically at right angles to the frame in its angled position, *balances the load*, as shown in the diagram, and makes it easy for the "99-M" to move straight ahead with a blade load that would either stall an ordinary Motor Grader, or cause it to slide sideways.

AUSTIN-WESTERN COMPANY
AURORA, ILLINOIS, U. S. A.

BUILDERS OF ROAD MACHINERY

Austin-Western

BUY MORE WAR BONDS

IRON AND STEEL PRODUCTS—BASE MILL PRICES

	STRUCT. SHAPES-PLATE	REINF. BARS ¼-in. billet *b*	RIVETS ½-in. structural	WIRE NAILS Base *d*	SHEET PILING Base	STEEL RAILS Per Gross Ton: Standard	Light	Re-rolled	TRACK SUPPLIES: Angle Bars	Std. Spikes *e*	Tie Plates *e*	Track Bolts
Birmingham	$2.10	$2.15	$3.75	$2.55	.....	$40.00	$40.00	$39.00	$2.70	$3.00	$2.15	$4.75
Chicago	2.10	2.15	3.75	2.55	$2.40	40.00	40.00	39.00	2.70	3.00	2.15	4.75
Pittsburgh	2.10	2.15	3.75	2.55	2.40	40.00	40.00	39.00	2.70	3.00	2.15	4.75
Buffalo	2.10	2.15	.....	.....	2.40	.....	.....	.....	.....	.....	2.15	.....
Cleveland	2.10	2.15	3.75	2.55	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown	.....	2.15	.....	.....	.....	.....	.....	.....	.....	.....	3.00	.....
Detroit	.....	2.27‡	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Gulf ports	2.47*a*	2.52*a*	.....	.....	2.85*a*	.....	.....	.....	.....	.....	.....	.....
Pacific ports	2.75*a*	2.80*a*	.....	3.05	2.95*a*	.....	.....	.....	.....	.....	2.30	.....

‡ Delivered. *a* F.o.b. cars dock. *b* Rail steel same as billet prices. *c* Other basing points include Portsmouth, O., Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., and Pacific coast ports, on tie plates alone. Steelton, Pa., spikes alone, Lebanon, Pa., Richmond, Va. *d* Add switching charge $18 per

IRON AND STEEL PRODUCTS—F.O.B. WAREHOUSE, PER 100 LB., BASE PRICE

	STRUCTURAL SHAPES Per 100 lb. base price	REINFORCING BARS* Per 100 lb., ¼ in., base price: 15 tons or over *b* New billet	Rail steel	Add Switch	$/cwt. for Del.	EXPANDED METAL LATH Per 100 sq. yd., carload lots: Std. diamond mesh, 3.4 lb.	Std. ribbed 3.4 lb.	WELDED FABRIC REINFORCING: Per 100 sq. ft., carload lots 4x16 in., No. 5 & 10 wires	4x12 in., No. 8 & 12 wires	6x6 in. No. 6 & 6 wires Per sq. yd.	SHEET PILING Per 100 lb. base price
Atlanta	$2.34	$2.40	$2.40	$.02½	$.10	$21.06	$23.00	$1.82	$1.35	$0.1719	$3.04
Baltimore	3.70	2.90	2.75	.....	.10	22.50	24.50	1 70	1.27	.1611	3.00
Birmingham	2.10*a*	2.15	2.15	.02½	.10	19.00	21.00	1.80	1.34	.1701	....
Boston	3.912	3.994	....	$20 C.L.	.10	18.50	29.50	1.76	1.31	.1656	2.77
Chicago	2.10*a*	2.15	2.15	.03	.05	21.50	23.50	1.67	1.25	.1575	2.40
Cincinnati	3.68	2.53*cd*	2.53*cd*	.....	.05	19.50	21.50	1.66	1.25	.1566	....
Cleveland	2.10*a*	2.15	2.15	.02½	.10	19.50	21.00	1.66	1.25	.1566	....
Dallas	4.25	3.17	3.17	.....	....	25.00	27.50	1.93	1.42	.1827	....
Denver	4.57	3.33*k*	....	.....	....	26.50	26.50	1.97	1.45	.186	....
Detroit	3.65‡	2.52‡	2.52‡	.....	.10	30.00	30.00	1.68	1.26	.1584	2.66
Kansas City	4.19	2.61*cd*	2.61*cd*	.0	.05	24.50	26.50	1.78	1.33	.1683	2.874
Los Angeles	3.65*f*	2.575	2.425	.02½	.05	23.00	27.50	1.93	1.42	.1827	3.65
Minneapolis	3.81‡	2.73	2.73	.0	.10	25.00	27.00	1.80	1.34	.1701	2.73*d*
Montreal	3.95*i*	2.90*i*	2.80*i*	.....	....	31.00*hi*	46.00*hi*	2.76	3.44*i*	.2821*i*	....
New Orleans	4.22½‡*b*	2.52	2.52	.05	.10	19.00	21.00	1.82	1.35	.1715	2.875
New York	3.75	2.76*c*	2.76*c*	.....	.15	17.50	19.50	1.76	1.32	.1665	2.74
Philadelphia	3.658	3.668	....	.....	....	19.50	21.50	1.71	1.28	.1611	2.72
Pittsburgh	2.10*a*	2.15	2.15	.02½	.10	23.00	26.50	1.59	1.20	.1503	2.40
St. Louis	3.697	2.74	2.74	.0	.05	28.00	34.00	1.69	1.27	.1602	2.70
San Francisco	4.35	2.825	2.675	.02½	.10	21.00	24.50	1.93	1.42	.1827*	3.85
Seattle	2.75*a*	2.80*a*	....	.....	....	34.50	38.50	1.93	1.42	.1827	2.95*a*

‡ Delivered. *a* Mill prices. *b* 5-15 tons, add 15c. 1-5 tons, add 25c. Less than 1 ton, add 50c. *c* 20 tons or over Base. *d* Mill price plus freight. *e* F.o.b. dock. *f* Includes delivery in free delivery zone. *g* Less than 1 ton, add 25c.; 1 to 5 tons, add 10c. * High scrap steel prices cut former 15c. differences between rail steel and billet in many mills. *h* List price. *i* Plus Dominion and Province sales tax. *k* Quotation on changed basis; no actual price change.

PLUMBING, HEATING, WATER, SEWER AND DRAIN PIPE

	C. I. PIPE Per net ton f.o.b. 6 in. to 24 in. *a*	VITRIFIED SEWER PIPE: Per foot, std. 8 in., s.s.	Delivered std. 12 in., s.s.	ASTM 24 in.,	C13-35 36 in.	CLAY DRAIN TILE Per 1,000 ft., carload lots, f.o.b. 6 in.	8 in.	CONCRETE SEWER PIPE Per ft., delivered; ASTM 12 in.	C 14-35 24 in.	WROUGHT STEEL PIPE Full standard weight, *h*: 1 to 3 in., Black %	Galv. %	Butt Weld 3½ to 6 in.: Black %	Galv. %	Lap Weld
Atlanta	$49.66	$0.26*b*	$0.468*bc*	$1.8525*c*	$4.68*c*	$85.00	$128.00	$0.45	$1.642	48.2	54.2	59.7	51.2	
Baltimore	53.00	.35	.60	2.70	7.25	160.00	200.00	.55	1.80	65.5	57.5	63.0	54.5	
Birmingham	45.00	.275	.495	1.95	5.50	100.00	220.00	.50	1.70	62.2	54.2	59.7	51.2	
Boston	55.40	.371*r*	.7155*r*	2.79*r*	7.6875*r*	170.00‡*r*	265.00‡*r*	.60	1.95	....	....	....	....	
Chicago	54.33	.35	.675	2.70	7.00	100.00‡	150.00‡	.45	1.85	66.0	55.0	64.5	53.0	
Cincinnati	53.27	.231	.4455	1.80	5.125	105.00‡*s*	170.00‡*s*	.75*t*	1.75*t*	57.1	43.4	54.0	39.4	
Cleveland	54.75	.266*r*	.513*r*	2.115*r*	5.535*r*	90.60	139.40	.36	1.38	58.5	57.5	66.0	54.5	
Dallas	56.43	.31	.58	2.25	5.00	90.00	110.00	.46	1.57	59.9	51.9	57.3	48.3	
Denver	61.56	.29†	.52†	2.16†	3.00*n*	125.00	200.00	1.00	2.22	58.4	50.4	55.7	47.2	
Detroit	54.75	.385	.7425	2.925	7.75	170.00*u*	260.00*u*	.40	1.75	57.6	44.0	54.5	40.2	
Kansas City	55.73	.35	.59	2.20	6.20	140.00	260.00	.45	1.60	35.9	46.4	46.6	59.9	
Los Angeles	68.40	.325†	.585†	2.70†	6.75†	130.50	217.50	1.00	2.00	61.1	50.1	58.6	47.1	
Minneapolis	57.47	.308†	.549†	2.196†	6.25†	.....	.....	.90	2.10	64.2	53.2	60.7	49.2	
Montreal	67.00	.85*o*	1.50*o*	5.25*p*	8.50*ap*	45.00*m*	64.00*m*	.48*m*†	1.92*m*†	....	....	....	....	
New Orleans	51.78	.37*r*	.78	1.69	....	150.00	220.00	.45	1.65	62.4	54.4	58.8	50.3	
New York	52.40	.308	.594	2.52	6.45	.....	.....	.60	1.40	64.9	53.9	62.4	50.9	
Philadelphia	51.00	.35	.675	2.75	7.50	165.00	225.00	.45	1.75	56.6	42.8	53.6	39.1	
Pittsburgh	56.00	.266†	.513†	2.295†	5.945	97.80	154.20	.85*v*	2.00*v*	68.5*i*	57.5*i*	66.0*i*	54.5	
St. Louis	53.62	.32	.576	2.304	6.00	100.00	260.00	1.00*j*	2.00*k*	56.4	42.6	52.5	38.4	
San Francisco	68.40	.3625*d*	.6525*d*	2.61	6.52	115.00	192.50	.58	2.34	45.0	31.0	41.0	26.0	
Seattle	70.20	.40	.72	2.88	7.20	115.20	.....	.51*l*	1.44*l*	....	....	....	....	

‡ Delivered. † F.o.b. *a* B. & S. class B and heavier, C/L lots, 200 tons and over Burlington, N. J. (base) $49.00. Based on existing freight rates; subject to rate change. Gas pipe and class A, $3 per ton additional. 4 in., $3 per ton additional, 30 in. and larger usually $2 per ton less. *b* Double strength. *c* List to dealer. *d* List. *e* 30-inch. *f* Less 5% for cash. *g* Culvert pipe. *h* Discounts from standard list consumers carload prices, except Pittsburgh prices are f.o.b. mill. Base price $200 per net ton. List prices per ft.: ½ in., 8½c.; ¾ in., 11½c.; 1 in., 17c.; 2 in., 37c.; 2½ in., 58½c.; 3 in., 76½c.; 4 in., $1.09; 6 in., $1.92 3 per cent tax on transportation costs not included. *i* Applies also at Lorain, Ohio, mills. Chicago delivered base is 2½ points less on butt, 1½ on lap. Freight is figured from Pittsburgh, Lorain, O., Chicago Dist. Billing is from point producing lowest price at destination. WROUGHT IRON PIPE: Base prices and list prices per ft. same as wrought steel pipe. Discount for Pittsburgh base. Butt-weld—1 in. and 1¼ in. black 34, galv. 16; 1½ in. black 38, galv. 18; 2 in. black 37½, galv. 18. Lapweld—2½ in. to 3½ in. black 31½, galv. 14½; 4 in. to 8 in. black, 32½ galv. 17. *j* Reinforced; spec. C 76-37. *k* Reinforced; spec. C 75-37. *l* Plus sales tax. *m* Tax included. *n* 27-in. pipe. *o* Less 30%. *p* Less 53%. *r* Truck delivery. *s* Price quotations on delivered basis since May, 1940; current f.o.b. price $84 for 6 in.; $130 for 8 in. *t* Reinforced pipe prices since May, 1937; current plain pipe prices are: 12 in., 36c.; 24 in., $1.30. *u* Scarce: carload quantities not readily available.

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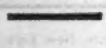

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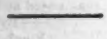

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LUMBER, TIMBER PLYWOOD—PER M FT., B.M., CARLOAD LOTS F.O.B.

	SHORT LEAF YELLOW PINE AND DOUGLAS FIR — All S. L. Y. P. is No. 2 common or better end for No. 1 N. C. Box. (Prices in Bold Face)								LONG LEAF Y. P. Merchantable grade		PLYWOOD Rail freight increment (See note for base price)	
	All Fir planks No. 2 common, Fir timber is No. 1 common. Lengths up to 20 ft. (Prices in italics)								up to 20 ft.		5/8"	3/4"
	1x6 Rgh	1x8 Rgh	2x4 Rgh	2x6 Rgh	2x8 Rgh	2x10 Rgh	3x12 Rgh	6x12 Rgh	12x12 Rgh	2x12 Rgh	12x12 Rgh		
Atlanta	$40.00	$40.00	$32.00	$35.00	$34.00	$37.00	$46.00	.....	.....	$57.00	$64.00	$17.90	$21.85
Baltimore	44.00	46.00	44.00	46.00	47.00	52.00	65.00	.....	.....	115.00	120.00	18.25	22.25
	48.00	*49.00*	*55.00*	*55.00*	*55.00*	*57.50*	*68.00*	*$75.00*	*$75.00*	.....	.....	.....	.....
Birmingham	45.00	45.00	44.50	43.50	44.50	47.50	68.00	55.00	56.00	.....	.....	17.35	21.15
	50.00	50.00	49.50	48.50	49.50	52.50	72.00	.....	.....	67.50	70.00	.....	.....
Boston	60.00[a]	60.00[a]	60.00[a]	60.00[a]	60.00[a]	62.00[a]	66.00[a]	.....	.....	58.00[a]	58.00	18.25	22.25
	55.00	*55.00*	*54.00*	*54.00*	*54.00*	*54.00*	*58.00*	*58.00*	*58.00*	.....	.....	.....	.....
Chicago	54.00	54.00	55.00	54.00	54.00	60.00	68.00	.....	.....	80.00[z]	95.00[z]	14.60	17.80
	55.00	*55.00*	*54.00*	*54.00*	*54.00*	*55.00*	*86.00*	*86.00*	*87.00*	.....	.....	.....	.....
Cincinnati	47.50	49.00	42.50	42.50	42.50	44.50	67.00	.....	.....	65.00	65.00	17.35	21.15
	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cleveland	42.50[k]	42.50[k]	52.50[k]	51.00[k]	65.00	65.00	83.00	83.00	83.00	.....	.....	17.75	21.60
Dallas	45.25	45.25	44.50	43.00	43.00	47.25	60.75	58.75	58.75	88.75	85.00	14.60	17.80
Denver	63.50[i]	62.00[i]	65.00[i]	65.00[i]	65.00[i]	66.00[i]	69.00[i]	*88.00*	*89.00*	.....	.....	10.45	12.70
Detroit	61.00	61.00	57.75	57.75	57.75	63.75	71.00	70.75	90.00	70.75	90.00	17.35	21.15
	57.00	*57.00*	*57.00*	*57.00*	*62.75*	*72.75*	*75.00*	*76.00*	*90.00*	.....	.....	.....	.....
Kansas City	69.00	69.00	67.00	65.50	67.00	69.00	84.00	.....	.....	84.00	94.00	12.60	15.40
	66.00	*66.00*	*59.50*	*59.50*	*59.50*	*59.50*	*75.00*	*80.00*	*80.00*	.....	.....	.....	.....
Los Angeles	*60.00*	*60.00*	*60.50*	*60.75*	*59.25*	*59.25*	*72.75*	*72.00*	*72.00*	.....	.....	9.90[ph]	12.05[ph]
Minneapolis	59.00[a]	59.00[a]	.....	.....	.....	.....	.....	.....	.....	.....	.....	12.60	15.40
	58.00	*58.00*	*57.00*	*57.25*	*56.25*	*57.00*	*64.75*	*65.50*	*65.50*	.....	.....	.....	.....
Montreal	*58.00*	*61.00*	*54.00*	*58.00*	*60.00*	*66.00*	.....	.....	.....	200.00	200.00	.....	.....
	54.00	*54.00*	*57.00*	*57.00*	*57.00*	*58.75*	*62.00*	*62.00*	*62.00*	.....	.....	.....	.....
New Orleans	40.00	40.00	37.00	35.00	34.00	36.00	46.00	.....	.....	55.00	69.00	14.60	17.80
	31.00	*31.00*	*33.00*	*31.00*	*34.00*	*32.00*	*33.00*	.....	.....	.....	.....	.....	.....
New York	67.50	67.50	62.50	62.50	62.50	64.00	74.00	.....	.....	120.00[f]	125.00[f]	18.35	22.25
	.....	.....	*65.00[i]*	*65.00[i]*	*65.00[i]*	*65.00[i]*	[Range from $75 to $95]			.....	.....	.....	.....
Philadelphia	75.00	75.00	75.00	75.00	75.00	75.00	75.00	.....	.....	130.00	130.00	18.25	22.25
	75.00	*75.00*	*75.00*	*75.00*	*75.00*	*75.00*	*85.00*	*90.00*	*90.00*	.....	.....	.....	.....
Pittsburgh	50.80	53.20	62.75	55.00	60.85	62.50	76.25	.....	.....	.....	.....	18.10	22.05
	69.20	*68.10*	*68.10*	*65.30*	*65.20*	*65.65*	*82.75*	*83.75*	*83.75*	.....	.....	.....	.....
St. Louis	61.00	61.00	57.00	56.00	57.00	59.00	71.00	*75.00*	*75.00*	87.00	87.00	14.60	17.80
San Francisco	*41.00*	*41.00*	*36.50*	*36.75*	*35.75*	*35.75*	*37.50*	*36.00*	*36.00*	.....	.....	7.30[g]	8.90[g]
Seattle	*45.50*	*45.50*	*44.50*	*44.50*	*43.25*	*43.25*	*43.50*	*43.00*	*41.75*	.....	.....	0.00	0.00

Bold Face type, Southern Pine. *Italics, Douglas Fir.* [1] Long leaf. [2] Roofers, N. C. Pine. [3] Spruce. [4] Native. [5] Western Pine, No. 3 Common. [7] Spruce. [8] Norway Pine. ‡ Delivered. *a* Yard prices. *b* Contractors discount in Minneapolis and St. Paul discontinued May 21, 1938. *c* 5M ft. or less. *d* F.o.b. cars San Francisco freight rate. *e* 10% discount taken off. *f* Up to 18 ft. † Plus sales tax.

Note: Special concrete form grade Fir Plywood, 4' by 8' panels, 5-ply, sanded 2 sides, water resistant glue, carload lots, delivered per 1,000 sq. ft. surface, Seattle base price on 5/8", $95.15; on 3/4", $104.85; price includes oiling and sealing charges. For other centers add rail freight increment from table or proper size. For resin dipped treatment, add $10.50 per M. *g* Lower rate by water shipment. *h* 50,000 lb. minimum. *i* Ranges from $65 to $69. *j* Average price. *k* August 1943 price. *l* September price; none later available.

GLASS, EXPLOSIVES, CHEMICALS

	WINDOW GLASS — Discounts from jobbers list, Aug. 15, 1938 Single or Double Thickness		EXPLOSIVES — Per lb. 40% Ammonia Gelatin in 50-lb. cases delivered in 200 lb. lots*	
	A quality	B quality		
Atlanta	75%	75%	$0.15	
Baltimore	78%	79%	.15	
Birmingham	76%	76%	.105	
Boston	77%	78%	.15	
Chicago	77%	77%	.15	
Cincinnati	77–10%	77–10%	.15	Price of 60% Ammonia Gelatin in $0.01 per lb. higher than 40%
Cleveland	77%	77%	.19	
Dallas	76%	76%	.1625	
Denver	76%	76%	.155*e*	
Detroit	77%	77%	.1575	
Kansas City	77–10%	77–10%	.155	
Los Angeles	86%*d*	88%*d*	.1575	
Minneapolis	77%	77%	.155	
Montreal	40–5%*ab*	47%*ac*	.1675†	
New Orleans	70%	75%	.16	
New York	81%	82%	.22*f*	
Philadelphia	78%	79%	.15	
Pittsburgh	79%	79%	.1225	
St. Louis	77–10%	77–10%	.155	
San Francisco	66%	73%	.155	
Seattle	75%	75%	.1575†	

a Discount from list Sept. 1939; sales tax included, but 6% tax exemption not allowed for. *b* Single thickness. *c* Double thickness. *d* Discount from jobbers' list Sept. 15, 1928.

* Urban prices influenced by service charges or local storage and delivery regulations, do not consistently reflect quantity prices in less congested areas. *e* F.o.b. Louviers, Colo. *f* In boroughs of Kings, Queens and Richmond, and in Manhattan south of Canal St. add delivery charge of $6.00 per trip. [1] F.o.b.

40% Ammonia Gelatin price ranges in other than urban areas, per lb. (except Seismograph Grades)

	C/L 20,000 lb. net	Tons	200 lb. lots
E. of the Miss., except Fla. and Me	$0.105	$0.13	$0.15
W. of Miss. to Rocky Mtn. States, Fla. and Maine	.11 –.1175	.135 –.1475	.155 –.1675
Rocky Mtn. States	.11 –.1225	.135 –.1525‡	.155 –.1725‡
Pacific N. W. States	.1075–.12	.1375–.15	.1575–.17
Pacific S. W. States	.1050–.1125	.135–.1425	.155–.1625

‡ F.o.b. Louviers, Colo., or Butte, Mont.

PILES, TIES—F.O.B.

PILES

Prices per linear foot, fir and pine, bark on, f.o.b. cars, New York. Fir based on Wash. and Ore. points to New York shipping area; pine based on freight from Norfolk.

Dimensions	Points	Length	By Rail—Pine*	By Rail—Fir
12-in. at butt	6-in.	30 to 50-ft.	$0.34	....
12 in.— 2 ft. from butt	6-in.	50 to 59-ft.	.35	....
12-in.—2-ft. from butt	6-in.	60 to 69-ft.	.36	....
12-in.—2-ft. from butt	6-in.	90 to 100-ft.	...	.513
13-in.— 3-ft. from butt	5-in.	91 to 100-ft.	....	.5625
14-in.— 2-ft. from butt	6-in.	50 to 69-ft.	.41	.62
14-in.— 2-ft. from butt	6-in.	70 to 79-ft.	.43	.59
14-in.— 2-ft. from butt	5-in.	80 to 85-ft.	.53	....
14-in.— 2-ft. from butt	5-in.	85 to 89-ft.	.56	....
14-in.— 2-ft. from butt	5-in.	90 to 100-ft.	....	.61

* Pine piling over 80-ft. available only in limited quantities.

RAILWAY TIES

Prices f.o.b., per tie for carload lots:		6"x8"x8' Untr.	6"x8"x8' Tr.	7"x9"x8'6" Untr.	7"x9"x8'6" Tr.
Boston	Oak	$1.50	....	$2.00	....
	Pine	2.00	$3.00*a*	2.50	$3.00*a*
New York	S. L. Sap Pine	1.43/1.54	2.59	1.76	2.86
	Mixed Oak	1.71	2.59	2.42	3.58
Birmingham	White Oak	1.00	1.60*a*	....	2.25*a*
Chicago	Red Oak	....	2.00/2.25*a*	....	2.87/3.00
Los Angeles	Douglas Fir	2.00	3.25*a*	2.90	4.70*a*
Philadelphia	Red Oak	....	2.10*ag*	....	3.25*ag*
St. Louis	White Oak	1.63	....	2.19	....
	Red Oak	1.63	2.20*a*	2.19	3.04*a*
	Sap Pine or Cypress	1.70	....	2.06	....
San Francisco	Douglas Fir	1.25*bef*	....	....	3.00*ef*
Montreal	Birch or Maple	.85	.95	....†	....†

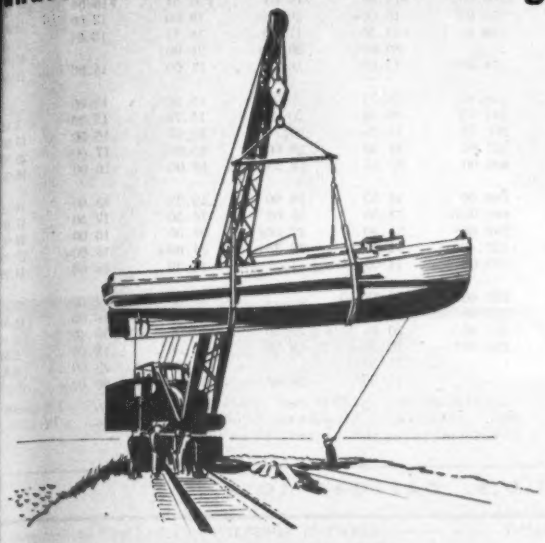
Tr.— Treated; Untr.— Untreated. *a* Creosoted. *b* 6"x8"x8'6". *c* Empty cell. *d* Zinc. *e* Green. *f* F.o.b. cars. † Out of market. *g* January 1943 price, none later available.

CHEMICALS

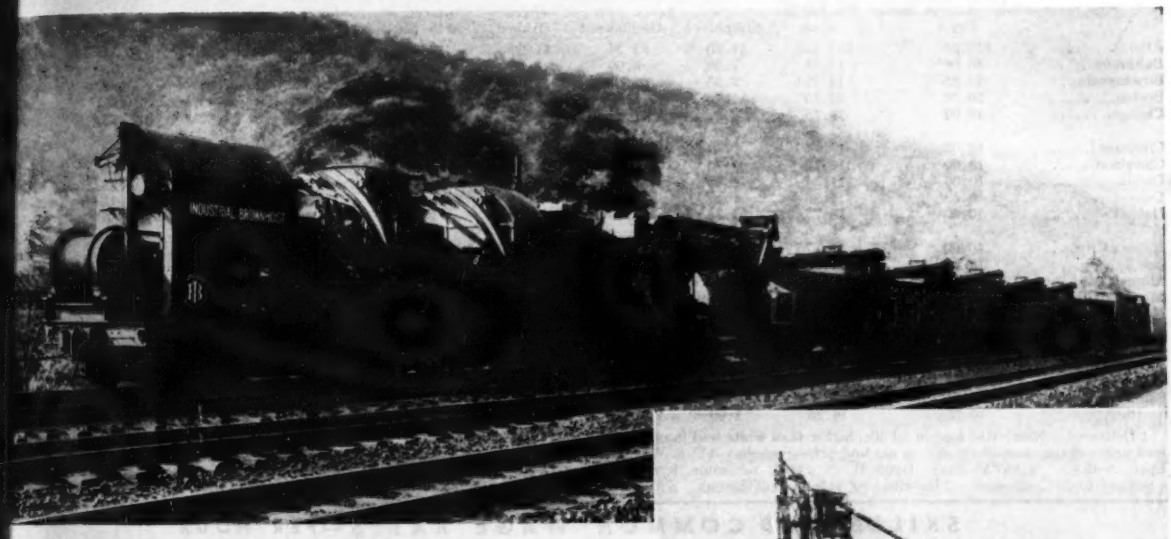
Water, sewage treatment, road work, f.o.b. carlots, New York

Bleaching powder, in drums, f.o.b. works, per 100-lb.	$2.50– 3.10
Chlorine cylinders, liquid, per lb., delivered	.0525
Calcium chloride, 77–80%, flaked, 100-lb. paper bag, del'd, ton.	18.50–35.00
Silicate of soda, 52 deg. in drums, f.o.b. works, per 100 lb.	1.40
Soda ash, 58%, in paper bags, per 100 lb. dense	1.15
Sulphate of aluminum, commercial, in 100-lb. bags, per ton	23.00–25.00
Sulphate of copper, in bbl., per 100-lb.	5 00

n Railroads, Docks, in Plants — Industrial Brownhoist Equipment andles materials with the greatest speed and efficiency



Shown here are three examples of Industrial Brownhoist material handling equipment. At left is an I.B. diesel locomotive crane known the country over for its long life and low cost operation. Below center is shown an I.B. railroad ballast cleaning machine. Clamshell buckets excavate 24 inches below the ties. Ballast is returned to road bed after passing over a series of screens. Dirt removed is carried to the rear by conveyors and loaded into cars. This machine will operate without interference to traffic or adjoining tracks.



At right is shown an I.B. 10-12 ton traveling bridge crane for unloading and storing iron-ore. Bridge span is 340 feet center to center of runways. Raisable apron extends 112 feet overall out from the center line of bridge pier and is hinged near end of dock to clear the boat rigging while docking.

Regardless of your material handling problem, chances are I.B. engineers have met and solved a similar one in the past.

INDUSTRIAL BROWNHOIST CORP.

BAY CITY, MICH. • DISTRICT OFFICES: New York, Philadelphia, Cleveland, Chicago • Agencies: Detroit, Birmingham, Houston, Denver, Los Angeles, San Francisco, Seattle, Vancouver, B. C., Winnipeg, Canadian Brownhoist Ltd., Montreal, Quebec.

STRUCTURAL CLAY BUILDING TILE, BRICK AND LIME—DELIVERED

	STRUCTURAL CLAY TILE—PARTITION—SCORED Per M. lots of 2,000 pieces or over, 3x12x12 in.	4x12x12 in.	8x12x12 in.	STRUCTURAL CLAY TILE—LOAD BEARING—SCORED Per M. lots of 2,000 pieces or over, 8x12x12 in.	10x12x12 in.	12x12x12 in.	BRICK Per M. in quantity, Common backing	Straight hard	LIME Per ton, Hydrated finishing	In paper, Common hydrated	Carload Pulverized or lump
Atlanta	$104.00	$114.00	$199.00	$234.00	$244.00	$250.00	$15.00	$18.04	$26.54	$15.04	$15.04
Baltimore	84.00	90.00	170.00	200.00	260.00	300.00	16.00*k*	20.00*k*	18.00	13.00	2.90
Birmingham	80.00	85.00	160.00	191.00	232.00	288.00	14.50	17.00	18.11	13.64	2.25
Boston	103.75*a*	110.65*a*	207.45*a*	248.90	.....	.....	20.00*i*	20.00*i*	21.00†	.....	16.00
Chicago	72.00	77.00	145.00	197.00	243.00	278.00	15.00	16.00	17.00	15.00	12.50
Cincinnati	65.55	69.90	131.20	148.70	210.35	240.45	25.75	25.75	15.50	13.00	.....
Cleveland	71.25	76.20	125.50	150.60	201.90	231.15	20.00	20.00	15.75*j*	13.25*j*	3.50
Dallas	67.90	73.25	145.80	174.96	227.62	281.72	15.25*i*	16.75*i*	19.00	15.00	15.00
Denver	84.80	95.40	153.70	178.20	212.00	227.90	14.50	18.00	25.00*j*	17.00*j*	20.00
Detroit	92.70	96.70	181.20	206.75	267.50	306.00	22.25	22.25	18.00	16.00	16.00
Kansas City	67.00	69.00	89.00*e*	128.00	163.00	189.00	16.50	18.50	19.32	13.00	10.92
Los Angeles	73.50*tr*	89.50*tr*	128.00*ctr*	210.00*tr*	368.00*tr*	460.00*tr*	13.50	15.00	16.50	17.50	17.50
Minneapolis	87.00*b*	92.80*b*	157.30*b*	.....	189.00*b*	262.00*b*	25.50	27.50*g*	21.00	16.00	19.00
Montreal	94.55*a*	100.45*a*	199.50*a*	160.45*a*	109.40*at*	137.40*av*	21.08†*u*	28.35†*u*	24.60*u*	18.00*u*	20.00*u*
New Orleans	72.00	72.00	135.00	162.00	210.00	260.00	14.00	.....	18.30	12.08	14.10
New York	78.40	83.60	115.00*e*	193.30*h*	238.80*h*	295.60*h*	17.50/18.50	.....	20.00	14.00	17.00
Philadelphia	85.30	91.00	170.50	204.60	252.00	312.00	17.00	20.00	19.00	16.00	15.00
Pittsburgh	72.85	78.55	147.25	163.75	217.50	231.00	20.50	22.50	17.90	15.40	2.50
St. Louis	67.00	95.00	130.00	190.00	244.00	290.00†	20.50	19.50	22.00	18.00	2.50
San Francisco	96.00	108.00	144.00	108.00*x*	.....	.....	21.50	.....	24.00	23.00	2.50
Seattle	115.00	125.00	230.00	.....	.....	.....	20.50*f*	24.00*f*	20.00*s*	20.00*s*	20.00

† F.o.b. *a* Smooth. *b* Carload lots delivered to job. *c* 6x12x12 in. *d* Not load bearing. *e* 48 lb. tile. *f* Less $1.00, ½ cash 15 days, balance 30 days *g* Selected common. *h* F.o.b. Perth Amboy, N. J. *i* F.o.b. Warehouse only. *j* LCL. *k* $1.00 discount if paid in 10 days. *l* Lump. *m* Per bbl., 180 lb. *o* Per bbl., 200 lb. *p* 280 lb. bag. *r* 5% discount 10 days. *s* 2% discount cash. *t* 5½x8x12. *u* 8% sales tax included. *v* 6x12x12-in. *w* Per 220 lb. bbl. *x* Sept. 1944 prices, Oct. not available on tile.

PAINT, ROOFING—F.O.B. CARLOAD LOTS

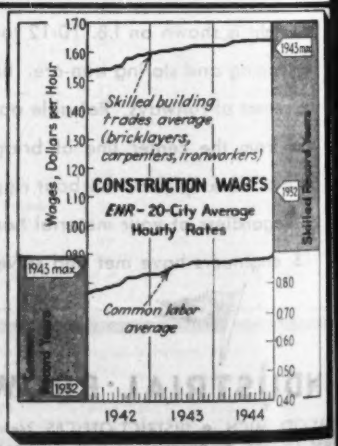
	RED LEAD Per 100 lb. in 600-lb. (Approx.) bbl. Dry *a*	WHITE LEAD Per 100 lb in oil	READY-MIXED PAINT Per gal., drums Graphite *b*	Aluminum *b*	Ferric Oxide *d*	ROOFING SUPPLIES Carload lots f.o.b factory Rolls, slate surfaced, 85-90 lb. per sq.	Asphalt felt, per 100 lb.	Tar felt, per 100 lb.	Asphalt coating per gal.	Tar pitch 350 lb. bbl. per ton
Atlanta	$10.25	$14.125	$1.30	$2.25	$1.20	$1.90	$1.61	$1.61	$0.27	$29.00
Baltimore	10.00	13.75	2.00	3.00	2.50	2.30	2.70	2.70	.40	29.00
Birmingham	10.25	14.125	2.35	3.50*r*	1.98*r*	2.10	2.03	2.03	.32	28.33
Boston	10.00	13.75	1.75	2.50	2.31	2.00‡*h*	3.30‡*uv*	3.30‡*uv*	.25‡	21.00‡
Chicago	10.00	13.75	....	....	....	1.75*hf*	1.74*hf*	1.82*hf*	.33*f*	23.00*f*
Cincinnati	10.00	13.75	1.70	2.90	1.60	2.20	2.10*h*	2.10*h*	.33	25.00
Cleveland	10.00	13.75	1.70	2.90	1.60	1.93	1.83*h*	1.83*h*	.25	27.00
Dallas	10.00	14.50	1.88	2.11*n*	.05*l*	1.75*h*	1.66*h*	1.66*h*	.35	30.00
Denver	10.50	14.25	....	....	.27*l*	2.45	2.95	2.95	.35	28.00
Detroit	10.00	13.75	1.75	3.00	1.60	2.25	2.25	2.25	.50	23.00
Kansas City	10.00	13.875	2.30*g*	2.55*gr*	2.16*g*	2.10	2.30	2.30	.28	27.50
Los Angeles	10.25	14.25	1.60	2.25	2.30	2.10	1.50	....	.45	.....
Minneapolis	10.00	13.875	....	....	....	1.8025*i*	1.7098*hi*	1.7098*hi*	.32	23.00
Montreal	.....	11.05	2.50*p*	4.90*p*	3.15*p*	4.02*t*	2.58*t*	3.01*t*	.89*t*	2.10*t*
New York	10.00	13.75	2.03	....*r*	1.82	1.7098	1.6273*o*	1.6273*o*	.26	23.00
Philadelphia	10.00	13.75	1.60/1.80	2.20*r*	1.55	1.75	1.66	1.66	.32	23.00
Pittsburgh	10.00	13.75	1.05	1.95	.80	1.95	1.84*h*	1.84*h*	.34	26.00
St. Louis	10.00	13.75	2.28*s*	2.89*s*	1.96*s*	1.70	1.75	1.75	.33	23.00
San Francisco	10.25	14.00	1.80	2.75*n*	1.35	1.71	2.40	2.40	.33	30.50
Seattle	10.25	14.25	1.90	3.00	....	2.15	2.16*h*	....	.35	26.80

‡ Delivered. Note: Red lead in oil 50c. higher than white lead in oil. *a* Red lead prices change frequently due to pig lead price changes. *b* U. S. War Dept. Spec. 3-49A. *c* ASTM Spec. D266-31. *d* 80% minimum ferric oxide. *e* Subject to 25% discount. *f* Distributors' price to contractors. *g* 5 gal. can. *h* Per roll, 65 lb. *i* Minneapolis and vicinity. *j* Asphalt pitch. *k* Per 100 lb. *l* Per lb. *m* Per bbl. *n* May, 1941 price. *o* 60-lb. roll. *p* Plus 8% sales tax. *r* Not available, except on priority rating; then quoted specially. *s* December 1942 price. *t* Federal tax included. *u* 90-lb. roll. *v* Truck delivery

SKILLED AND COMMON WAGE RATES—PER HOUR

	Bricklayers	Carpenters	Struct. Iron Workers	Hoisting Engineers	Plasterers	Common Labor—Building	Common Labor—Heavy Const.
Atlanta	$1.50	$1.25	$1.50	$1.25	$1.50	$0.40	$0.50
Baltimore	1.75	1.4375	1.80	1.625/2.00	1.50	.75	.75
Birmingham	1.75	1.25	1.50	1.25/1.50	1.50	.65	.65
Boston	1.625	1.50	1.65	1.50/1.875	1.667	1.00	1.00
Chicago	1.75	1.70	1.76	1.75	1.825	1.10	1.10
Cincinnati	1.875	1.50	1.675	1.45/1.60	1.625	.85	.85
Cleveland	1.875*c*	1.575	1.875	1.875	1.875	1.085	1.15/1.25
Dallas	1.625	1.25	1.50	1.75	1.625	.60	.75/1.25
Denver	1.65*b*	1.50*b*	1.50*b*	1.50/1.625*b*	1.50*bf*	.80*b*	.80*b*
Detroit	1.725	1.50	1.825	1.675/1.825	1.725	.90/100	.90
Kansas City	1.65	1.50	1.625	1.675	1.70	.975	.90
Los Angeles	1.50	1.35	1.625	1.375	1.667	.875	.875
Minneapolis	1.625	1.44	1.625	1.50	1.625*e*	.95	.95
New Orleans	1.50	1.25	1.50	1.50	1.375	.65	.75
New York	2.00*b*	1.85*b*	2.00	2.00*b*	2.00*b*	1.10*f*	1.00
Philadelphia	2.00	1.58	2.00	2.00	2.00	.825	.825
Pittsburgh	1.90	1.75	1.75	1.8125	1.875	.90	.80
St. Louis	1.75	1.50	1.75	2.00	1.75	1.00	1.00
San Francisco	1.875	1.50	1.75	1.50/1.75	1.75	1.00	1.00
Seattle	1.845	1.565	1.745	2.00	1.865	1.145	1.145
Montreal*	1.05	.95	1.00	.90	1.05	.60	.65

b 7 hr. day. *c* Prevailing rate on government work. *e* 35 hr. wk.
* Cost of living bonus now included in basic wage.



ENR Skilled Average; (Bricklayers, Carpenters, Ironworkers) $1.641.
ENR Common Average; $0.890.

AMERICA IS

Built with Aggregate!

Ewing Galloway Photo

The Highway that goes to sea...

Stretching apparently endlessly out to sea runs the Key West Highway Viaduct, one of the world's great engineering feats. Every foot of its more than one hundred and thirty miles is strong enough to withstand nature's most destructive forces because it's built primarily of aggregate.

On highways, airports, dams and other permanent structures which also require enormous quantities of aggregate, the difference of even a few cents per ton in material costs becomes highly important. Because of this, Iowa engineers are constantly striving to improve the Cedarapids line to provide every possible advantage for its users to produce better products at still lower cost.

No matter what kind of a job you are supplying material for you'll profit more by using Cedarapids equipment. Iowa is known everywhere as headquarters for aggregate producing and crushing equipment and asphalt plants.

IOWA MANUF[illegible]NG COMPANY

CEDAR[illegible]S, IOWA

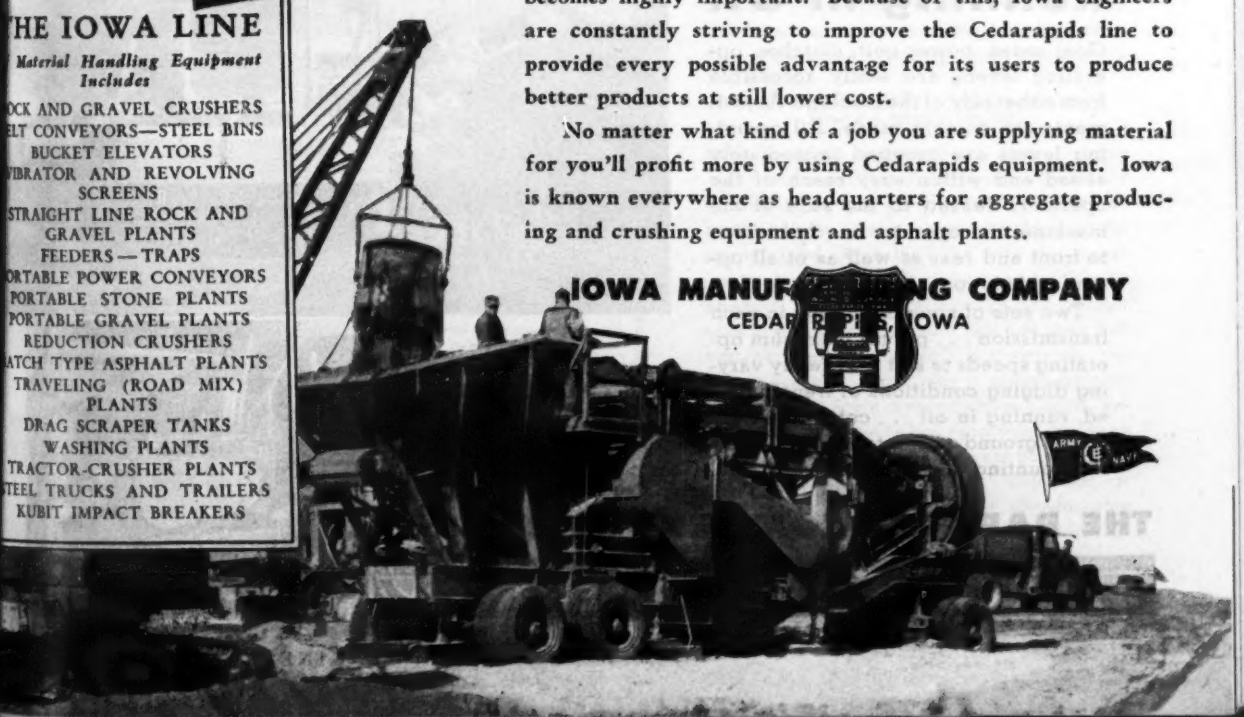
Cedarapids

Built by IOWA

THE IOWA LINE

Material Handling Equipment Includes

OCK AND GRAVEL CRUSHERS
ELT CONVEYORS—STEEL BINS
BUCKET ELEVATORS
VIBRATOR AND REVOLVING SCREENS
STRAIGHT LINE ROCK AND GRAVEL PLANTS
FEEDERS—TRAPS
ORTABLE POWER CONVEYORS
PORTABLE STONE PLANTS
PORTABLE GRAVEL PLANTS
REDUCTION CRUSHERS
ATCH TYPE ASPHALT PLANTS
TRAVELING (ROAD MIX) PLANTS
DRAG SCRAPER TANKS
WASHING PLANTS
TRACTOR-CRUSHER PLANTS
STEEL TRUCKS AND TRAILERS
KUBIT IMPACT BREAKERS



The Week IN ENGINEERING AND CONSTRUCTION

(Continued from page 75)

Funds sought to revive Savage River Dam work

A bill has just been introduced in Congress by Representative Beall of Maryland seeking $980,000 for the Upper Potomac River Commission with which that organization could complete the suspended Savage River Dam project in Maryland (*ENR* Sept. 7, 1939, p. 314). Started in 1939 as a WPA project, the work was shut down in Dec. 1942, because of the war and is now about two-thirds complete.

Located about 22 miles southwest of Cumberland, the project calls for a rockfill dam about 175 ft. high on the Savage River about 5 miles above the junction of that stream with the North Branch of the Potomac River. The work is planned to increase the dry-weather flow in the latter stream.

The original plans were prepared by the U. S. Army Engineers. It has not been announced how the Upper Potomac River Commission, which was established by the Maryland legislature and which has offices in Cumberland, would complete the work, whether by general contract or force account.

• • •

New Mexico has plans for 3,500 miles of roads

Three postwar highway programs involving the construction of nearly 3,500 mi. of road in New Mexico at a cost of $75,000,000 have been approved by the state highway commission, Fred Healy, state highway engineer, announced recently.

The latest program to be approved calls for the planning of 158 projects on the federal aid secondary system. Other programs include 53 projects in municipalities and 90 projects on the federal aid primary system. Planning of some construction in each of the three projects is complete, according to Mr. Healy.

Sewage disposal plant for Baltimore County

A $2,000,000 sewage disposal plant to serve nine communities in Baltimore County, Maryland, has been approved as a postwar project by the county commissioners, it was revealed recently by Christian H. Kahl, president of the board.

The construction of the sewage disposal plant would reduce the pollution of the Patapsco River and at the same time link up a modern sewerage system to the communities of Catonsville, Lansdowne, Halethorpe, Arbutus, Baltimore Highlands, English Consul, Rosemont, St. Denis and Relay, Mr. Kahl said.

It was decided to build the plant, rather than connect the county sewer lines with the Baltimore disposal plant on the recommendation of G. Douglas Andrews, chief engineer of the county's metropolitan sanitary district. Linking up with the city system would have cost $4,500,000, it was said.

PARSONS

TRENCHLINER

Enclosed Gears Running in Oil

Gear cases, power unit, clutches, operating levers, are easily accessible from either side of the machine. Adjustments are quickly made. All operating levers are grouped immediately ahead and within easy reach of the operator. Seated to the side of the machine, the operator has full vision to front and rear as well as of all operating functions.

Two sets of speeds . . . five in each transmission . . . permit maximum operating speeds to suit the greatly varying digging conditions of trenching operation. Gears are enclosed, running in oil . . . cut from solid steel blanks, fitted on precision ground alloy steel shafts. Anti-friction bearings are used for mounting all the gear case shafts. Gear cases are dust tight.

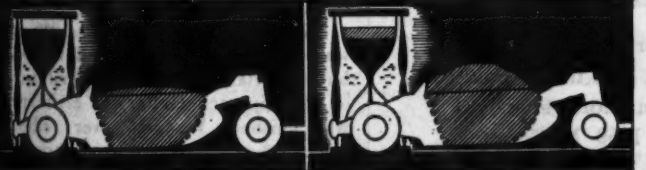
THE PARSONS COMPANY Newton, Iowa

TRENCHING EQUIPMENT

LET'S ANALYZE *this problem of* SCRAPER CAPACITY

TWO REASONS WHY "HEAPED" CAPACITY IS MISLEADING

First, it is important to remember that all materials tend to "swell" when loosened by excavation and loading. Moreover, each type of material has a different "percentage of swell", depending on the percentage of voids and moisture content. That's why "heaped" capacity can vary all over the lot . . . why a heaped load will seldom even equal the struck capacity of a scraper, in actual "pay dirt."



On short hauls and poor loading material, it usually doesn't pay to waste time getting a full "heaped" load because it may take you practically as long to load the last quarter as it did the first three-quarters—regardless of whose scraper you use. In other words, on short haul jobs, you'll be time and money ahead if you can avoid spending too much of your total time cycle in loading.

LA PLANT-CHOATE

Earthmoving and Land Clearing Equipment

For years, it has been common practice among various scraper manufacturers to talk about "pay dirt" in the same breath with "*heaped*" capacity. Yet as every experienced dirt mover knows, figures on "heaped" capacity can be very misleading because *all classes of material tend to heap differently when loaded into a scraper.* Moreover, on many jobs, it doesn't pay to load "the last yard" because too much of the total time cycle may be consumed in loading—even with the help of a pusher.

Struck Capacity Safer!

For these reasons, LaPlant-Choate engineers have consistently maintained that the only logical way to estimate scraper yardage is on the basis of *struck* capacity—using the exact volume of the scraper bowl. Even then, the wise dirt mover usually deducts a certain percentage for "swell". However, by using *struck* capacity, you at least have a safer, more accurate figure to start with because "heaped" capacity is always an "unknown quantity." That's why it always pays to find out *which figure* a manufacturer is using, before accepting any claims regarding "yardage moved." For further information, see your LaPlant-Choate "Caterpillar" distributor, or write, LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa.

WOOD PRESERVATION, to be effective, calls for plenty of push to drive the preservative deep into the wood. Painting it on or dipping gives an illusion of adequacy, but it's a case of "only skin deep"—unable to handle the hard jobs expected of treated lumber.

PRESSURE TREATMENT is the basis on which all the wood-preserving industry's service records are built. Pressure treatment with Wolman Salts* preservative produces Wolmanized Lumber*—wood with ability to stand up on the toughest jobs. Its dependability has been proved by millions of feet, some in service nearly twenty years.

OUR PILOT PLANTS start with the pressure process as a *must.* Constant research there, in the laboratory, and in the field, is helping to make wood treatment even more effective. American Lumber & Treating Company, 1659 McCormick Building, Chicago 4, Illinois.

*Registered Trade Marks

WOOD THAT'S Alloyed FOR SAFETY AND ENDURANCE

AMERICAN LUMBER & TREATING COMPANY

N.Y. City adopts zone plan limiting coverage

When the New York City Board of Estimate enacted into law on Dec. 1 the amendments to city zoning regulations proposed to it on Nov. 1 by the City Planning Commission (*ENR*, Nov. 9, vol. p. 591), the first major changes were made since zoning was initiated in 1916. Intended to improve realty values and prevent blighted areas by increasing the amount of open space, light and air about cheaper construction, the new law imposes additional restrictions on the height, bulk and area of new buildings.

In effect, existing height and area districts into which the city was divided are now changed into the next more restrictive ones. Cuts of ⅛ to ¼ in wall heights at building lines and a sharp reduction in ground coverage of retail buildings in built-up areas are imposed. The regulation permits builders who provide off-street parking within their buildings to use a compensating amount of space for ground-floor retail use. This provision probably will be of advantage to large retail establishments, but it is believed, however, that small retailers will be unable to find space for vehicle entrance.

Recognized as imperfect, the zoning amendments were approved with the understanding that the planning commission will continue studies for complete revision of the city's zoning rules. These studies are expected to take at least two years.

• • •

New Mississippi bridge near St. Louis completed

Dedication of the Jefferson Barracks Bridge, spanning the Mississippi River five miles south of St. Louis, took place on Dec. 9 and 10, with Gov. Dwight Green of Illinois and Gov. Forrest Donnell of Missouri speaking at the ceremonies.

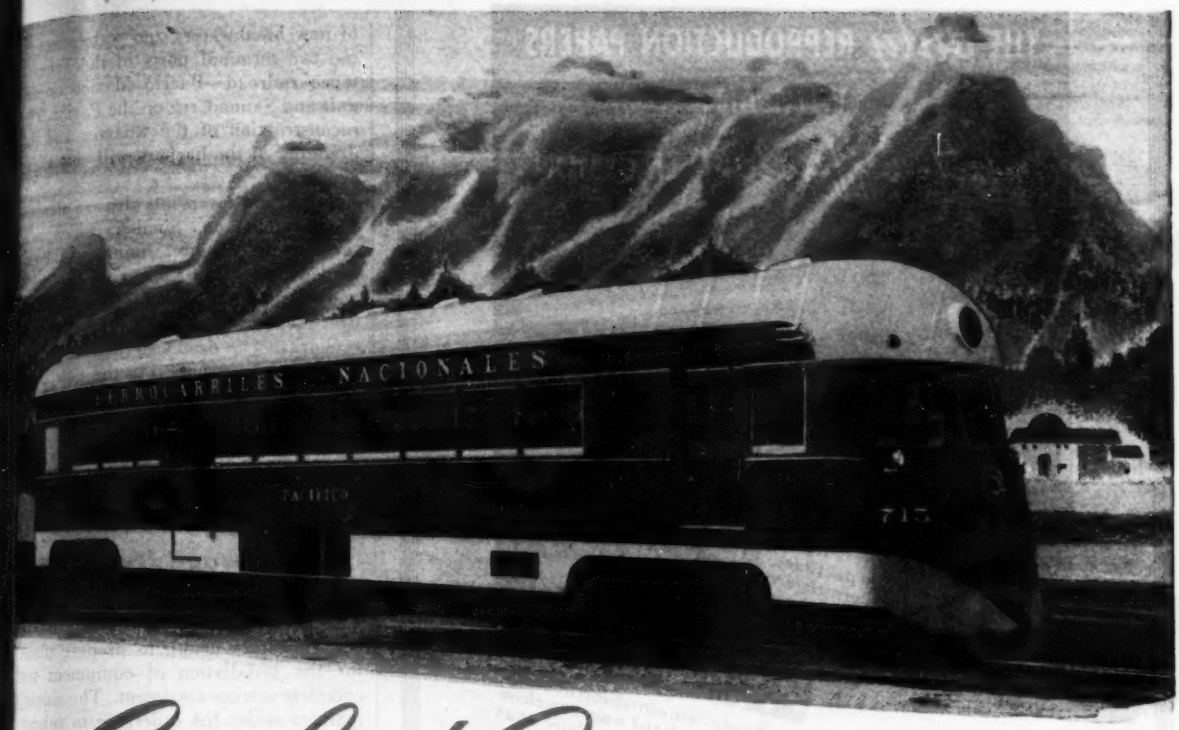
The project was started in 1940 and was to have been completed in 1942, but material shortages delayed work on the approaches after the main span was finished. Viaducts over railroad tracks on the east approach are still under construction.

• • •

Mexican harbor work to cost $10,000,000

Construction of drydocks, piers, ways, and railroad facilities at shipyards at San Juan de Ulua, Vera Cruz, Mexico, will cost approximately $5,000,000.

Work will start soon on construction



Sea Level Power 12,000 Feet Up

B-W SUPERCHARGED ENGINES . . .

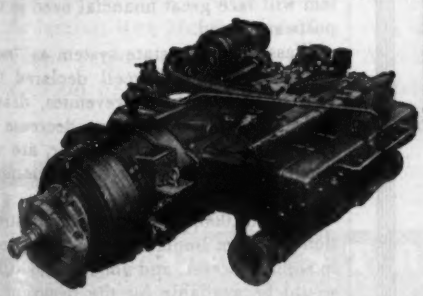
Pull These Motorailers Over The Andes

Faster acceleration from standstill . . . power to negotiate steep grades . . . sea-level performance at Bogota and points 12,000 feet up—these requirements were readily met by the twenty self-propelled rail cars delivered before the war to the Colombian Nat'l Railways.

Built by American Car & Foundry Company, these cars were driven by Waukesha-Hesselman engines *supercharged* with B-W (McCulloch) Superchargers.

Not only have these supercharged engines met all power demands of the motor rail cars with their trailers, but have also enabled these cars to take the place of unobtainable locomotives in hauling strings of freight cars.

Two of these horizontal type Waukesha-Hesselman six cylinder, electric-ignition engines, suspended under the floor, constitute the power plant of each rail car. Note supercharger in upper corner. It is driven by a V-belt from extension of the crankshaft.



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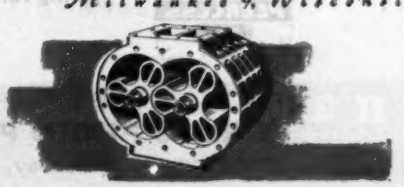
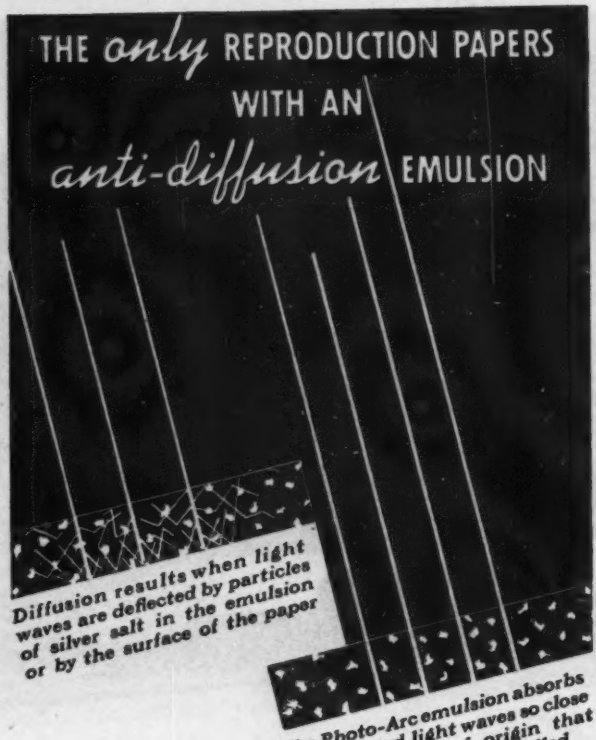


B-W Positive Displacement Superchargers supercharge at all speeds and in proportion to the need of the engine for air.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of new breakwaters and warehouses in the two terminal ports of the Tehuantepec railroad—Puerto Mexico on the gulf and Salina Cruz on the Pacific. The reconstruction of the wharves and the dredging of the harbors will cost about $2,000,000.

Harbor improvements also are planned in Topolobampo, Sinaloa, which will serve as the Pacific terminus of the extended line of the Kansas City, Mexico and Orient Railroad from central Chichuahua.

Workshops, drydocks and shipways are under construction in the new shipyards at Tampico for building ships from 500 to 6,000 tons net. This work will cost about $3,000,000.

• • •

Pennsylvania cities to plan sewage treatment

Ten Schuykill River communities have been ordered by the Pennsylvania department of health to prepare plans for the installation of equipment for complete sewage treatment. The municipalities under the order are to submit construction plans by Dec. 31, 1945, with progress reports every month starting March 31, 1945.

The communities are Reading, Wyomissing, West Reading, Pottstown, Spring City, Royersford, Phoenixville, Norristown, Bridgeport and Conshohocken. James H. Duff, Pennsylvania Attorney-general pledged the full force of the justice department in the drive to clean up Pennsylvania's waterways.

Philadelphia is already under orders from the sanitary board to modernize its sewage treatment system. Reading has complete facilities but they are in need of modernization, it is said.

• • •

California seeks funds for postwar highways

Envisioning an $80,000,000 construction program in California during the four years following the war, State Director of Public Works C. H. Purcell told a state Senate investigation committee recently that the highway system will face great financial need in the postwar period.

Classifying the state system as "near insolvency", Mr. Purcell declared the present state gas tax revenues, drastically cut by a 60 percent decrease in auto travel since Pearl Harbor, are not adequate to carry on a full modernization program.

The $80,000,000 proposed construction is within limits of highway revenue in sight, however, and about $19,000,000 would be available for the program by June 30, 1945, Mr. Purcell declared.

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Elections and Activities

Maj. Gen. P. B. Fleming, Administrator of the Federal Works Agency, was among the speakers at the recent annual dinner meeting of the Washington, D. C., Society of Engineers. In telling of his recent trip to Europe General Fleming spoke particularly of England, where he said there is fear of a postwar shortage of labor, especially in the building trades, as many craftsmen have been killed or wounded and there is a tremendous amount of work to be done.

Another speaker was John Earl Baker, consultant of the Foreign Economic Administration, who told of his many years in China and of conditions there.

Beardsley Ruml has been re-elected chairman of the business committee of the National Planning Association. He is treasurer of R. H. Macy and Co. and chairman of the Federal Reserve Bank of New York. P. B. Stull, Wilmington, Del., vice president and director of Hercules Powder Co., was elected vice chairman, and Charles E. Wilson, president of General Electric Co., was elected a member of the committee.

At the November meeting of the District of Columbia Section of the American Society of Civil Engineers, Benjamin E. Jones, hydraulic engineer with the Geological Survey, was installed as president for the coming year. He succeeds Roy W. Crum, director of the highway research board of the National Research Council.

Other new officers are: Vice president, Frank L. Weaver, associate chief of the bureau of water power, Federal Power Commission; and secretary, T. Richie Edmonston, structural engineer and estimator with E. P. Knollman. C. J. Stevens, of the Bureau of Yards and Docks, U. S. Navy, was re-elected treasurer.

Ten men were made life members of the section. They are: George W. Case, director of the engineering experiment station at the University of New Hampshire, and now on leave with the U. S. Office of Education; Arthur P. Clark, sales agent for the Bethlehem Steel Co.; Harold E. Hilts, deputy commissioner of the Public Roads Administration; William H. McAlpine, chief engineer in the Office of the Chief of Engineers, U. S. Army; Melvin S. Rich, consulting structural engineer; George H. Shaw, senior architectural engineer in the U. S. Department of Agriculture; Capt. Ralph R. Tinkham, chief of the civil engineering division, U. S. Coast Guard; Charles H. Tompkins, president of the Charles H. Tompkins Co.; Frederick J. Trumpour, civil engineer and land surveyor; and George N. Wheat, associate structural engineer, construction division of the Veterans' Administration.

Officers elected recently by the Four States Section of the American Water Works Association at Philadelphia, Pa., were: Chairman, R. C. Beckett, Dover, Del.; vice chairman, H. E. Moses, Harrisburg, Pa.; secretary-treasurer, H. Lloyd Nelson, Philadelphia, Pa.; trustees for two years, C. P. Abraham, Lancaster, Pa., and J. M. Jester, Silver Springs, Md. The following trustees still have one year of their terms to serve: G. L. Hall, Baltimore, Md., and D. M. Radcliffe, Washington, D. C.

I. M. Glace, Harrisburg, Pa., continues as director until the last day of the 1945 conference of the A.W.W.A., at which time he will be succeeded by the newly elected director C. J. Lauter, Washington, D. C. Mr. Lauter will serve the regular three-year term in that office.

John J. Landers of the Landers Engineering Co., Buffalo, N. Y., has been elected president of the Erie County Chapter, New York State Society of Professional Engineers. Gust Karlsteen was elected vice president.

Arthur Weaver, engineer for Erie County parks department, continues as treasurer and Eugene Eldridge was retained as secretary.

H. H. Johnson, Smith Bros. & Wilson, Ltd. of Vancouver, B. C., has been elected president of the Vancouver General Contractors' Association. Mr. Johnson succeeds John Bennett of Bennett & White Construction Co., Ltd. Ralph C. Pybus, Commonwealth Construction Co., Ltd., was elected first vice-president and F. J. Dawson, Dawson Wade & Co., Ltd., second vice-president. Directors are J. Tucker, Dominion Construction Co., Ltd., P. A. Jones, Fraser River Piledriving Co., Ltd.; J. L. MacDougall, Coast Construction Co., Ltd.; L. G. Murray, B. C. Bridge & Dredging Co., Ltd., and A. E. Jenkins, Columbia Bitulithic Ltd.

N. J. Croner has been elected president of the Winston-Salem, N. C., Engineers Club, succeeding R. A. Thomas. Other officers are: Mason Garber, vice president; Charles M. Sprinkle, secretary and J. H. Sherrill, treasurer. Directors are: Harold Macklin and E. P. Hayes.

TOTAL WAR—ALLIED VERSION

FRANCE — A 15-B shovel loads rock for a crusher.
(Signal Corps Photo)

ENGLAND — [illegible] operations.
(Signal Corps Photo)

SICILY — [illegible] matting mats
(Signal Corps Photo)

SOUTHWEST PACIFIC — A 37-B shovel supplies trucks with aggregate. *(Official Navy Photo)*

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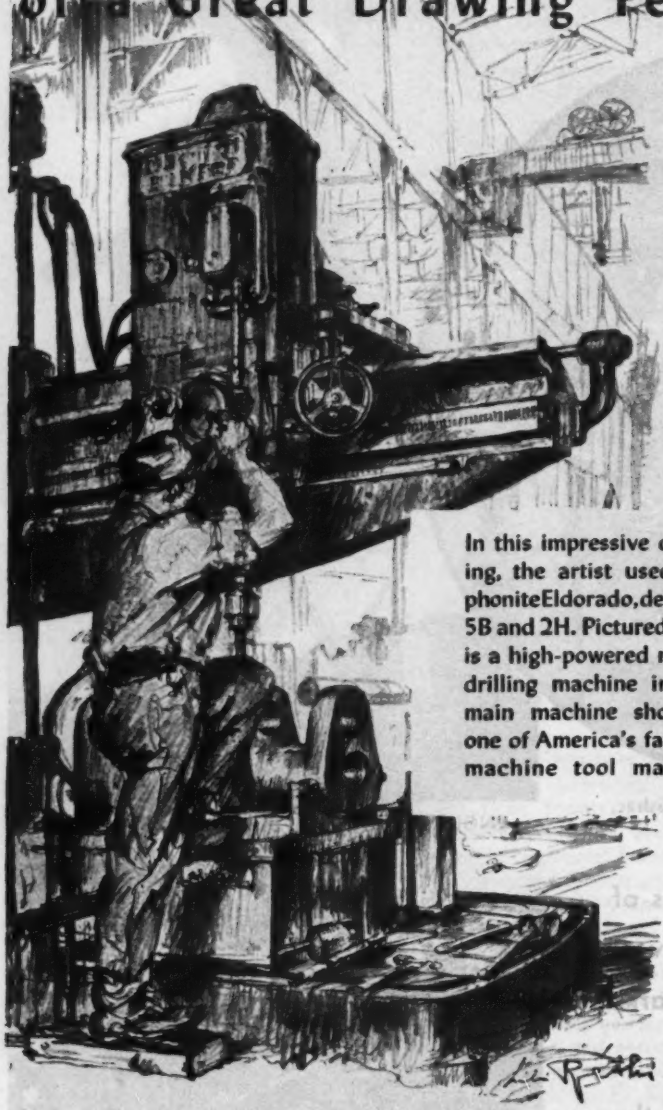

In this impressive drawing, the artist used TyphoniteEldorado,degrees 5B and 2H. Pictured here is a high-powered radial drilling machine in the main machine shop of one of America's famous machine tool makers.

You'll agree that the proof of a drawing pencil's superiority lies in ease of use and excellence of results. By those standards, the best drawing pencils in the world are made in America. Today, it is impractical—and old-fashioned—to bow to the name of any foreign-made pencil. Try America's best—Typhonite Eldorado!

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E. M. Johnson of Raleigh, N. C., was elected chairman of the North Carolina section of the American Water Works Association and the North Carolina Sewage Works Association at a recent meeting, succeeding J. R. Purser of Charlotte. Other officers elected are L. I. Lassiter, Wilmington, vice chairman, and D. M. Williams, Durham, secretary-treasurer.

Fred Lavis, consulting engineer of New York, recently addressed the Pan American Society of Massachusetts on "Land Transportation in Latin America". This was one of a series of talks and conferences sponsored by several trade and manufacturing organizations of Massachusetts, and given under the uspices of the Harvard Business School, to study and discuss postwar and future trade development and trade relations with the countries south of the Rio Grande. The speaker traced the railway and highway development of each country and various projects for intercommunication between the countries. While recognizing the great developments in air transportation and the advantages it has brought to travel in Latin America, the speaker expressed the belief that steamships, railways and highways remained the mainstays of commercial and even passenger transportation in Latin America, as they are in North America.

H. R. Emory, executive director of the Wilmington, N. C., Housing Authority, has been re-elected president of the North Carolina Council of Housing Authorities. Harold J. Dillehay, Charlotte, former building contractor, was elected first vice president; and Duncan J. DeVane, Fayetteville, second vice-president.

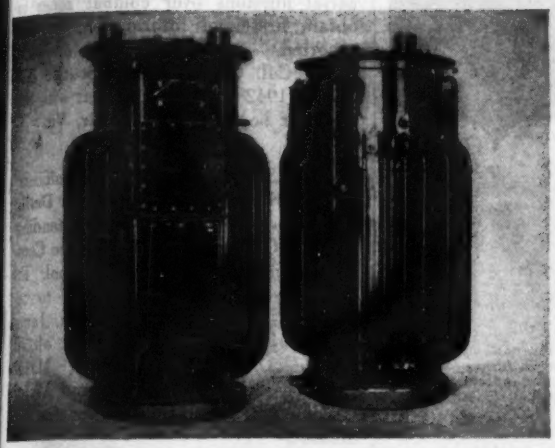
Henry J. Brunnier, consulting engineer of San Francisco, Calif., has been elected president of the American Automobile Association.

Mr. Brunnier, consultant on the San Francisco Bay Bridge and the Broadway low-level tunnels between Alameda and Contra Costa counties, is also an official of the California State Automobile Association, and a member of the California Major Highway Development Committee.

H. T. Persons, Laramie, Wyo., has been chosen president of the National Council of State Boards of Engineering Examiners. He succeeds Carl L. Svenson, Austin, Texas.

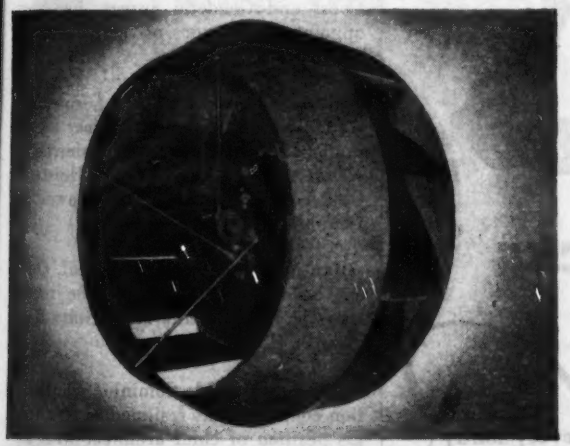
John C. Reming, Jr., Camden, N. J., was elected vice president and C. S. Crouse, head of the department of mining and metallurgical engineering at the University of Kentucky, was named director from the central states.

Against Corrosion

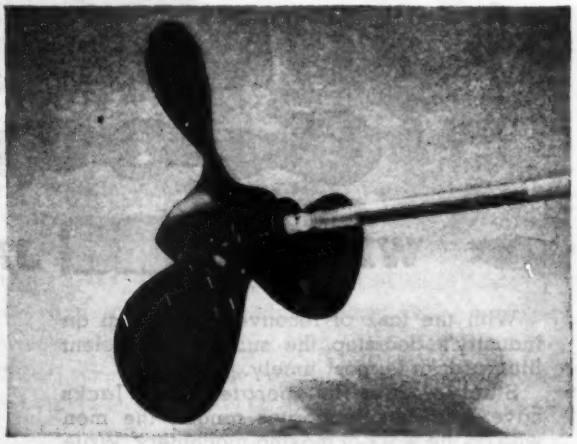


BAKELITE resin baking finishes dependably protect transformers in underground locations against the corrosion caused by continual dampness and humidity. When the installations are out of doors, these finishes give the same excellent protection against the severest kinds of weathering.

Two difficulties formerly experienced in coating woven wire screen filters —clogging, and lack of coverage at intersections—are now eliminated because of superior surface wetting characteristics of BAKELITE resin baking finishes.



This industrial ventilator has resisted the attacks of highly corrosive vapors. Protected by a BAKELITE resin baking finish, it shows no sign of corrosion.



Marine propeller exposed to salt water and abrasive particles in a test equivalent to four years' service. Three shafts (uncoated) were worn out by electrolytic action, yet the BAKELITE resin baking coating on the propeller remained in excellent condition.

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MEN AND JOBS

Col. Peter P. Goerz, former Seattle district engineer, U. S. Army Engineers, has been awarded the Legion of Merit for services as liaison engineer with the Air Force headquarters of the South Pacific. Overseas from November, 1943 to April, 1944, he "frequently undertook long, fatiguing and hazardous aerial missions over combat zones to obtain first-hand information," it was reported. A 1918 graduate of West Point, Col. Goerz left the Seattle district in 1942 for an assignment with the engineer board at Ft. Belvoir, Va.

Three Seattle Army Engineer officers, **Maj. Carl Anderson, Maj. John Detlie and Maj. Grant Gordon,** are attending the 21st General Staff class at the Command and General Staff school, Ft. Leavenworth, Kan. Scheduled to return to their Seattle posts in January, Major Anderson is chief of all Seattle District construction, Major Detlie is camouflage officer and Major Gordon is operations engineer for the district.

Maj. Robert L. Wicker, of Sanford, N. C., who prior to entering the armed service was connected with the U. S. Coast and Geodetic Survey, has been appointed director of personnel at Camp Davis, N. C.

Herbert H. Howell, Civil Aeronautics Administration district engineer at Columbus, Ohio, has been transferred to Kansas City, Mo. Earl F. Heist, of Chicago, will succeed Mr. Howell at Columbus.

Jan Van Stappen of Montreal, Que., has been put in charge of the reconstruction of the Netherlands State Railways in Holland.

John Schofield, dominion construction controller has resigned to return to his position of chief architect with the Canadian National Railways and Trans-Canada Air Lines. **Maj. Gen. J. P. MacKenzie** of Vancouver, B. C., has been named his successor. General MacKenzie, who won the D.S.O. with two bars and the Croix de Guerre in the last war, was general manager of the Hamilton Bridge Co. at the outbreak of the present war.

Worth B. Baldwin, project engineer for the U. S. Engineer office at the Army's Overseas Replacement Depot at Greensboro, N. C., has been transferred to the U. S. Engineer Office at Fort Bragg, N. C., as assistant resident

This is a Telsmith Portable Crushing Plant being operated by the Seabees on Guadalcanal. The two gas-drum halves at the top of the elevator form an ingenious rig devised by Seabee Sanborn (at extreme left) to keep the propeller wash of warming up aircraft from blowing away the crushed material, discharged by the elevator.

TELSMITH
with the Seabees
ON GUADALCANAL

"Every rock is a sock at Tojo"—that was the motto of the crusher crew of the 14th U. S. Navy Construction Battalion — working-fighting Seabee veterans of Guadalcanal and winners of the Presidential Citation. Part of that "outfit" is pictured above in action on Guadalcanal in 1943—making full-speed-ahead with their 10" x 21" Telsmith Portable Crushing Plant, crushing rock to maintain an air field.

Standing at the extreme left is C. A. Sanborn, Machinist's Mate First Class. Like many Seabees, he had previous civilian rock-crushing experience. He held an executive position with the Lehigh Stone Company, which has offices at Kankakee, and quarries at Lehigh, Illinois.

In all parts of the world the Seabees and Telsmith portable, semi-portable, and large scale aggregate production plants are carrying on, helping to bring V-day closer. Telsmith peacetime portables will have large capacity with lowest operating costs—*get Bulletin P-2.*

P-10

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engineer and executive officer. He went to Greensboro to supervise the construction of the area engineer office building at the ORD and during the main construction of the camp served as engineer-chief of operations. He later was made area engineer. Before going to Greensboro he was chief engineer during the construction of the Army Air Forces Technical School at Goldsboro, N. C., and designed and served as construction engineer on the municipal airport there, now operated entirely by the Army.

Travis L. Smith III, former engineer with Lockwood & Andrews, a design and construction engineering firm at Houston, Tex., has been promoted to major with the United States Burma Road Engineers operating with the Service of Supply's China Section. Major Smith was the principal engineer on the San Jacinto water project when he entered the army in 1943.

The Halifax, N. S., utilities commission, recently organized, has appointed **E. C. O'Leary** as operating engineer. He will be in charge of maintenance and construction of the Halifax water and sewerage system. He has been construction engineer and superintendent for the Standard Paving Maritime, Ltd., Halifax.

Lt. Col. John P. McGuinness has been named commanding office of the Engineer Battalion at Marine Base, Camp Lejeune, N. C., succeeding Maj. A. D. Gorham. Until detached for duty at Camp Lejeune, Colonel McGuinness served with an engineering unit on Guadalcanal.

James B. Ramsey has been appointed chief engineer and superintendent of the water department of Kansas City, Mo., succeeding the late **W. T. Bailey**. Two assistants to Ramsey named were **A. E. Robinson** of Kansas City, and **H. W. Poston** of Chicago. Ramsey, with the department since 1940, was graduated from the University of Kansas in 1937. Robinson and Poston both are University of Iowa engineering graduates.

L. L. Guy of Graham, N. C., formerly with the North Carolina State Highway and Public Works Commission as engineer and more recently with the Fairchild Aircraft Co. at Burlington, N. C., has been appointed superintendent of streets and sanitation at Graham.

G. A. Crawshaw, office engineer, and **A. G. Zapf**, city surveyor, of Miami, Fla., have resigned from the public service department. City employes for nine and 19 years, respectively, they will en-

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A TYPE AND SIZE TO SUIT EVERY DOMESTIC MEASUREMENT REQUIREMENT

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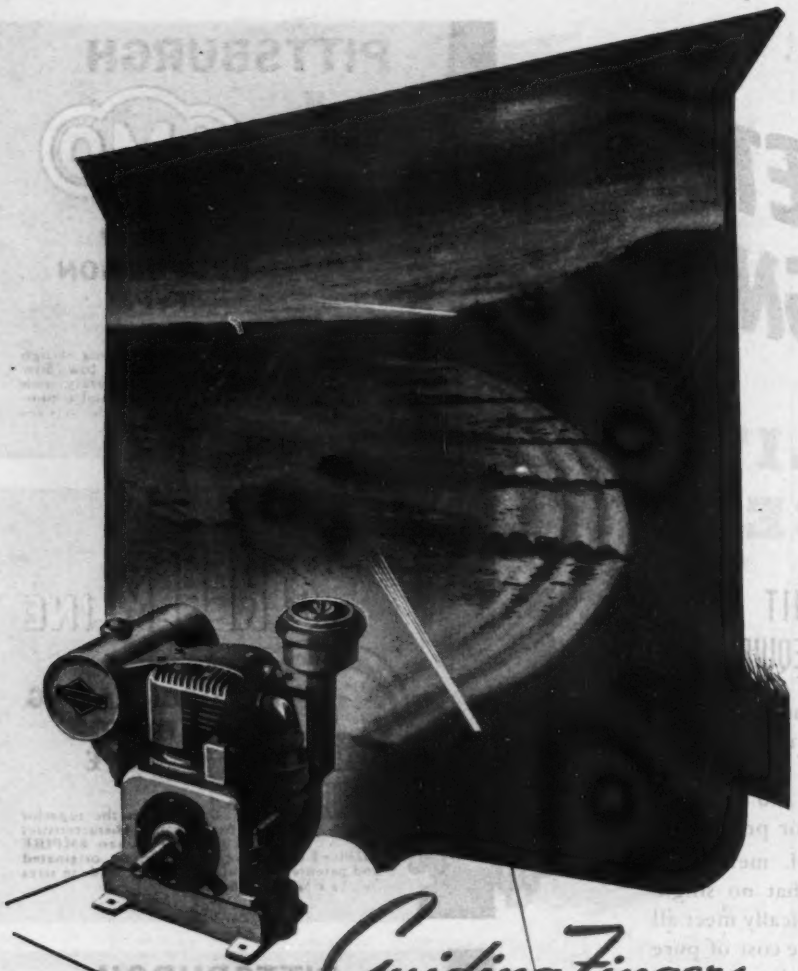

Guiding Fingers of Light

From newly established positions, portable beacon units guide and warn supporting ships and aircraft. Their electric generating plants are powered by rugged, quick-starting Briggs & Stratton engines — another one of many vital war services by hundreds of thousands of Briggs & Stratton engines.

Air-Cooled Power

4 CYCLE BRIGGS & STRATTON GASOLINE ENGINES

BRIGGS & STRATTON leadership in design, engineering and precision manufacture is backed by the performance record of more than TWO MILLION Briggs & Stratton engines—and a quarter-century of *continuous* production of *"air-cooled power."* You can profit by this experience in your plans for the future—whether you manufacture, sell or use gasoline-powered equipment or appliances. BRIGGS & STRATTON CORP., Milwaukee 1, Wisconsin, U. S. A.

gage in business as Crawshaw Engineering Co.

Capt. Ivan A. Bickelhaupt, CEC, USNR, recently Naval officer in charge of construction at the Marine Air Station at Cherry Point, N. C., has been made public works officer for the Fifth Naval District at Norfolk, Va. He was recently awarded the Legion of Merit for supervising construction of Naval bases, which proved "an important factor in ejecting the enemy from the North Pacific".

Evans C. McGraw, Lexington, has been appointed chief engineer of the Kentucky division of engineering and construction, replacing **Preston S. Sinton** who remains with the division. Another addition to the staff is **Roger P. Whitton** as assistant chief engineer.

Leslie E. Chambers of Buffalo, N. Y., for 10 years a civilian member of the Army Engineers, has been sworn into the Army Engineer Corps and commissioned a major. He has reported to Ft. Belvoir, Va., for basic training.

W. L. Voorduin has been appointed executive member of a newly formed Central Technical Power Board of India for a three year period. He will take charge of hydroelectric power design on a board of seven members, three of whom will be active executives and four advisors. Voorduin has been with the Tennessee Valley Authority for the past ten years, rising to the position of head of the Project Planning Division of the Water Control Planning Department.

George K. Leonard, former project manager of the Hiwasse projects of the Tennessee Valley Authority, will replace Mr. Voorduin as head of the Project Planning Division of TVA.

Roy V. Gilcrest has been appointed superintendent of municipal utilities at Wellington, Kan. He was formerly in a similar position at Carlyle, Ill.

H. J. Williams has been appointed superintendent of the municipal water and light plant at Carthage, Mo., to fill the vacancy created by the resignation of Fred Vance.

L. G. Angevine is now associated with the Kelly Well Co. at Grand Island, Neb., as consulting engineer. He was formerly superintendent of the water and electric plant at McPherson, Kan.

F. W. Lane of the Water Control Planning Department has left the Tennessee Valley Authority to resume teaching in the college of engineering at the University of Iowa.

WHAT IS YOUR POSTWAR MATERIAL HANDLING PROBLEM?

let MARION

SHOVELS • DRAGLINES • CRANES

PULL-SHOVELS • CLAMSHELLS • WALKERS

Solve it for you. *Write us today*

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HOVELS • DRAGLINES • CRANES • PULL-SHOVELS

LAMSHELLS • WALKERS • *from 3/4 cu. yd. to 35 cu. yds.*

Of course you can't see the difference — but it's there. One gear has been *shot-peened* and the other hasn't.

The shot-peening operation is just one of the added values that mark the Fuller Transmission which will be available for your peace-time operations. The full explanation is too long and technical to be repeated here, but it is a method of treating gears (or any metal parts subject to stress) by "pre-loading" the surface to prolong life and delay what is commonly called fatigue failure.

Fuller was the first manufacturer of heavy duty truck transmissions to adopt this relatively new process. Gears so treated have been running in Fuller Transmissions for a considerable time, with uniformly successful results.

The Fuller Transmissions of Tomorrow will be better than ever. And that—in view of Fuller performance during the trying war years—is saying a lot.

FULLER MANUFACTURING COMPANY, KALAMAZOO, MICHIGAN
Transmission Division
Unit Drop Forge Division, Milwaukee, Wisconsin

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Lt. Col. Raymond L. Moore, pioneer in making maps from photographs, has been assigned to a new, undisclosed area, having concluded his command of the 29th Engineer base topographical battalion at Portland, Ore. He was engaged in aerial surveys for the Tennessee Valley Authority when called to active duty as a reserve captain in 1940.

R. A. C. Henry, civil engineer, recently appointed chairman of Canada's new Air Transport Board, has also been named deputy minister of the new department of reconstruction, headed by C. D. Howe.

Capt. Willard N. Tonkin of Houston, Tex., former superintendent of airport and highway construction for the Gulf Bitulithic Co., has been promoted to major in the United States Army. He is now airport engineer in the grounds and buildings department of the A.A.F. Central Flying Training Command at Randolph Field, Houston.

Tilton E. Shelburn, a former member of the Indiana State Highway Commission, has become research engineer in the tests division of the Virginia State Highway Department. He was for eight years engineering instructor at Purdue University. His position in Richmond is a new one and will deal with postwar highway plans.

Joseph A. Whitman, Raleigh, N. C., consulting engineer, is supervising a public works program at Edenton, N. C., including installation of a water-softening system.

George Dickson, division maintenance engineer of the Iowa State Highway Commission at Forest City for 20 years, has resigned to go into other work. **Harry Cribbs,** commission resident engineer at Maquoketa, replaces him.

Joe Black, project manager of the Fort Loudoun project, and formerly at Watts Bar and Chickamauga Dams of the Tennessee Valley Authority, and previously with the Aluminum Co., has accepted a position with the Electric Bond & Share Corporation as construction manager in Brazil. He will leave for South America in late November.

R. E. Carpenter of Shelby, N. C., and **C. G. Summerlin** of Forest City, N. C., have obtained a certificate of incorporation to do business under the name of C. and C. Engineering and Construction Co., which will maintain offices at Shelby and do general construction of roads, buildings and bridges.

Homocord

construction in CONVEYOR BELTS -another MANHATTAN development- war-proved for your post-war use

Condor PRODUCTS

Conveyor and Elevator Belt • Compensated Belt • Transmission Belt • V-Belt • Air Hose • Contractors Hose • Fire Hose • Hydraulic Hose • Oil and Gasoline Hose • Sand Blast Hose • Steam Hose • Suction Hose • Water Hose • Chute Lining • Launder Lining • Industrial Brake Blocks and Lining • Molded Rubber Goods • Rubber Lined Tanks • Rubber Covered Rolls • Abrasive Wheels • Bowling Balls.

Here is a totally different type of Strength Member construction — developed in time to speed war production and now improved with FLEXLASTICS* for post-war use.

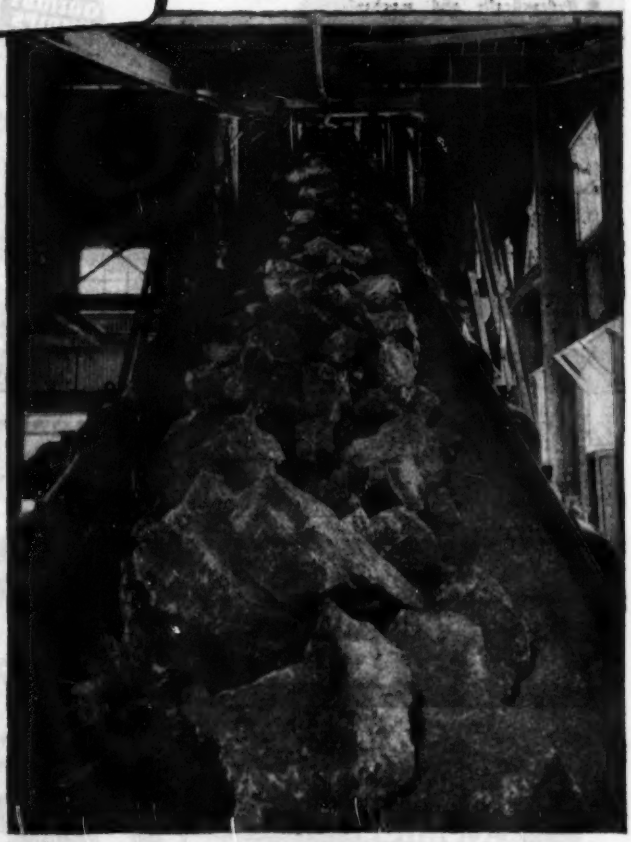
Pre-war installations have been delivering high tonnage on a steady basis that is adding to MANHATTAN'S already distinguished achievements in conveyor belt service.

Homocord construction has been invented and perfected by MANHATTAN engineers particularly and only for conveyor belt use, and it is not designed for use in any other products. It is the first and only conveyor belt possessing the virtues of a cord belt, but with the drawbar strength and resistance to fatigue to hold metal fasteners. It marks a distinct milestone in conveyor belt progress.

Longitudinal Homocords are grouped to give great tension strength and tied together with cross Homocords which allow exceptional troughing for full loading of the belt, plus the strength to permit use of fasteners.

These component Strength Members are sealed-in to make a homogeneous, pliable belt which flexes easily around end pulleys. The Homocords, embedded in moisture-proof FLEXLASTICS* and mildew-proofed as additional protection, have a flexible, resilient, rolling contact with each other to provide cushioned resistance for heaviest feed impact.

These are significant advantages that will help you meet tomorrow's needs. They are worth investigating now.



Homocord Conveyor handling unusually large pieces of limestone.

Detail of Homocord Strength Member construction. Note how open fabric structure permits rubber to penetrate and unite all parts into a homogeneous whole.

*The term FLEXLASTICS is an exclusive MANHATTAN trade mark. Only MANHATTAN can make FLEXLASTICS.

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THE MANHATTAN RUBBER MANUFACTURING DIVISION
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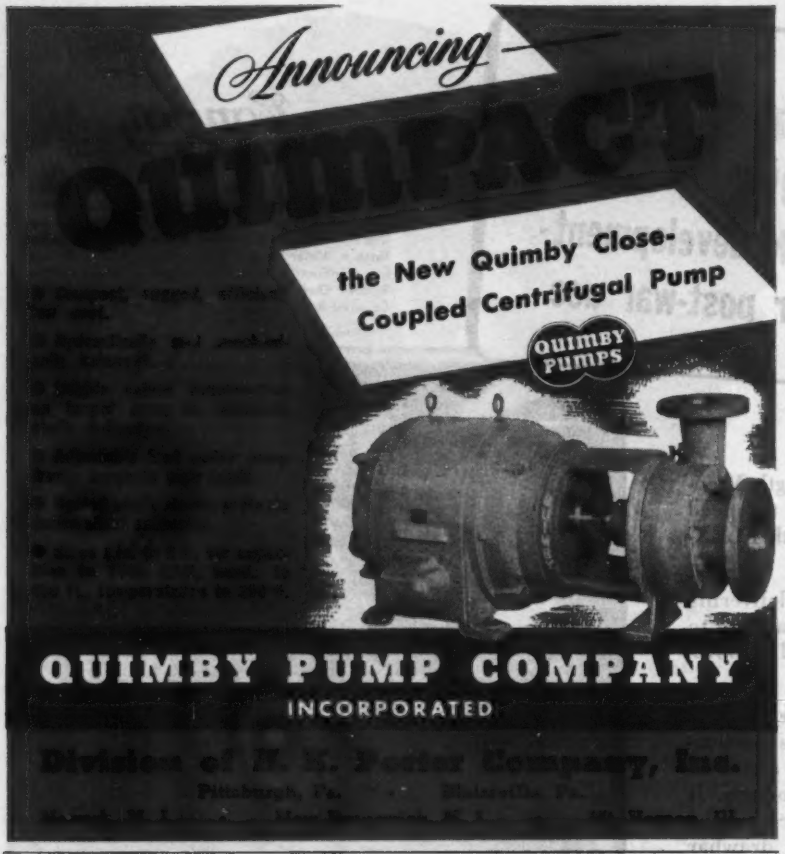

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are separate from
CRANKCASE
ON ALL
WISCONSIN
4-Cylinder V-Type
Air-Cooled ENGINES
The cylinders on all V-type Wisconsin Air-Cooled Engines are cast in pairs, separate from the crankcase, for quick, economical servicing when required. In case a cylinder is accidentally scored beyond the possibility of reboring, it is only necessary to replace a relatively inexpensive pair of cylinders instead of an entire engine block. The picture shows the Model VE-4 Wisconsin Engine, with protective shrouding removed, illustrating method of attaching cylinders.
Most H.P. per pound
WISCONSIN MOTOR
Corporation
MILWAUKEE 14, WISCONSIN, U. S. A.
World's Largest Builders of Heavy-Duty Air-Cooled Engines

New Engineering Books

(*Continued from page* 112)

A CENTURY IN CONSTRUCTION — James Stewart & Co. 189 pp.

CAN DO! THE STORY OF THE SEABEES—By Lieut. (jg) William Bradford Huie. 374 pp. E. D. Dutton & Co., New York. $2.75.

Reports and Pamphlets

Analysis of Financial Conditions of reorganized Municipal Corporations—Quebec Municipal Commission, Quebec, Que., Canada.

CITY FINANCES, 1942—Volume 3, Statistical Compendium. For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., 55c.

BOYS GROWN TALL—Biographical sketches of 50 Cleveland industrials. Published by the Cleveland Plain Dealer, Cleveland, Ohio.

POSTWAR PUBLIC WORKS—The Federal Works Administrator. For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, 25, D. C. 5c.

TOWN AND COMMUNITY POSTWAR PLANNING—A report prepared for the Postwar Reconstruction Committee of the Government of Manitoba, Winnipeg, Man., Canada.

THE QUEENS MIDTOWN TUNNEL—A reprint from *Proceedings*, Am. Soc. C. E., March, 1943. By Ole Singstad. New York City Tunnel Authority, 200 Madison Ave., New York.

NEW JERSEY—Highway Department report for 1943. H

HOW MANY CALIFORNIANS?—Summary of report, Estimates of Population Growth in California 1940-1950. California State Reconstruction and Reemployment Commission, Sacramento, 14.

CAMBRIDGE, MASS.—Annual report of the Board of Health for the year ending Dec. 31, 1943.

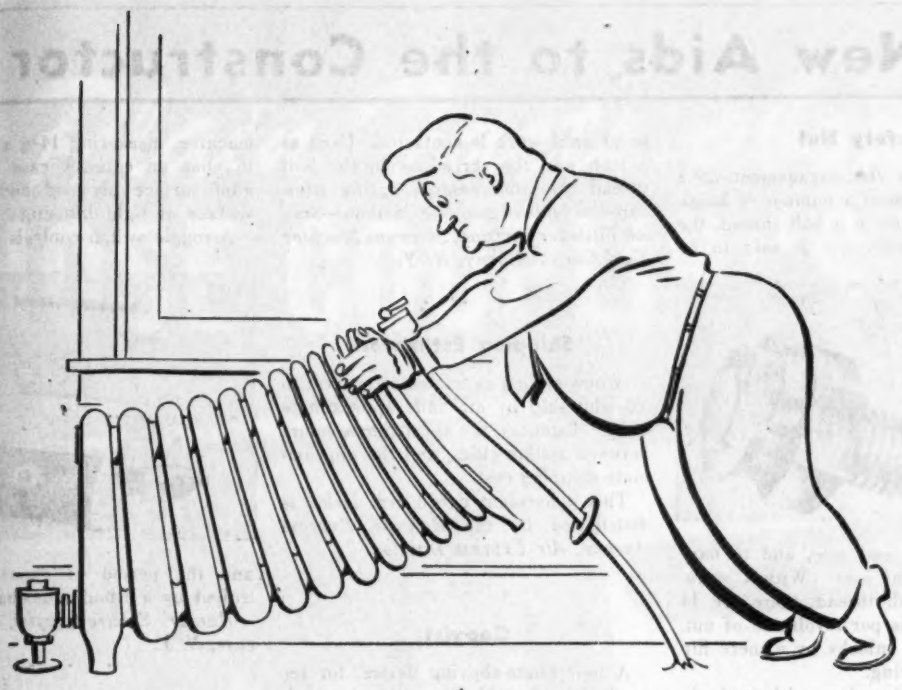
WALTHAM, MASS.—Annual Reports of the Department of Public Works and Board of Survey and Planning, 1942-1943.

FRANKLIN COUNTY AND COLUMBUS, OHIO—Report on Water Supply, Sept. 1, 1944, Ohio Water Supply Board, Columbus, Ohio.

ST. PAUL, MINN.—61st and 62nd Annual Report of The Board of Water Commissioners, 1942-43.

POSTWAR NATIONAL INCOME, Its Probable Magnitude—By Joseph Mayer. 34 pp. The Brookings Institution, Washington 6, D. C. 50c.

PROCEEDINGS OF THE THIRTIETH ANNUAL ROAD SCHOOL—Held at Purdue University, Jan. 24-26, 1944. Extension Series No. 56, The Engineering Extension Dept., Purdue University, Lafayette, Ind.



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The Webster Moderator System assures prompt heating-up, balanced distribution of steam and even room temperature throughout the building.

More Heat with Less Fuel

Webster Engineers have discovered through surveys of thousands of buildings that seven out of ten large buildings in America (many less than ten years old) can get up to 33% more heat from the fuel consumed.

If you're interested in flexible, adequate heating, write for "Performance Facts". This free booklet contains case studies of 268 modern steam heating installations and shows the great savings possible with the Webster Moderator System of Steam Heating.

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Pioneers of the Vacuum System of Steam Heating : : Est. 1888
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In the Webster Moderator System of Steam Heating there are just four control elements—an Outdoor Thermostat, a Main Steam Control Valve, a manual Variator and a pressure control Cabinet. These controls are an integral part of the Webster System . . . assuring the highest expression of comfort and economy in modern steam heating.

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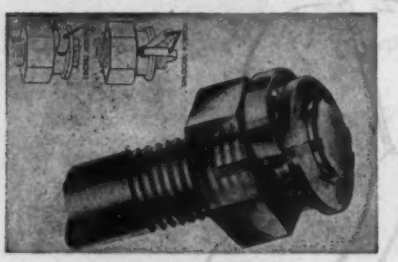
AUTOMATIC Webster Steam Heating

New Aids to the Constructor

Safety Nut

Operating by the engagement of a snap ring in one of a number of longitudinal serrations in a bolt thread, the new Simlok safety nut is said to be



easy to install, and safe, and to have many mechanical uses. With 7 serrations on the bolt thread, there are 14 locking positions per revolution of nut, which locks or unlocks by a mere flip of the locking ring.

This nut, designed to withstand abnormal heat, moisture and oil conditions, requires no additional torque or wrench-pull; it can be turned down by hand until work is contacted. Used as a stop nut, the serrations in the bolt thread are unnecessary; spring pressure provides stopping action.—*Simlok Fastener Division, Simmons Machine Tool Corp., Albany, N. Y.*

• • •

Shipping Estimator

A new sliding estimator of interest to all who ship by air finds approximate airline distances, the approximate hours between airline cities, and the approximate shipping cost.

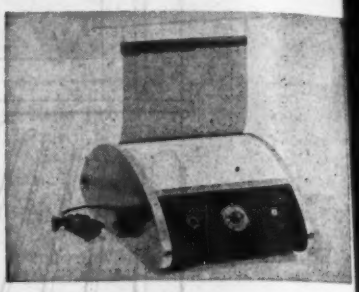
This convenient cardboard device is distributed by the *Railway Express Agency, Air Express Division.*

• • •

Copyist

A new photo-copying device, for reproducing anything written, typed, printed, drawn or photographed, has 12 x 18-in. capacity and weighs approximately 25 lb. This Model 50 machine, measuring 14¾ x 24½ x 8½ in., has an exterior case of seasoned gum surface plywood and a copying surface of light-diffusing "Lamicoid."

A toggle switch controls the lighting



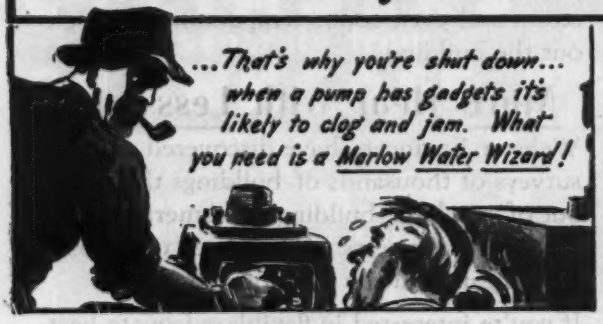
and the period of exposure is controlled by a Rhodes mechanical timer. —*Hunter Electro-Copyist, Inc., Syracuse, N. Y.*

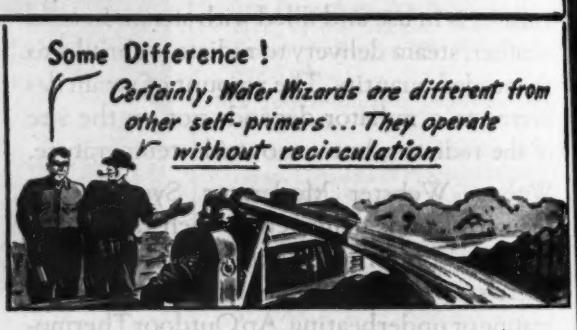
• • •

Plastic Floor Finish

A beauty treatment with many practical features for floors—linoleum, rub-

"You've got to expect that Gadgets Make Trouble" — SAID THE VETERAN CONTRACTOR...





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Stock pile covers, made with SISALKRAFT, are lightweight, easy to handle, low in cost. SISALKRAFT is specially treated for high "wet strength" to resist scuffing and rot. This processing of the kraft paper, plus the two-way fibre reenforcement, embedded in asphalt, results in scuff-resistant and waterproof properties that give dependable protection at moderate cost.

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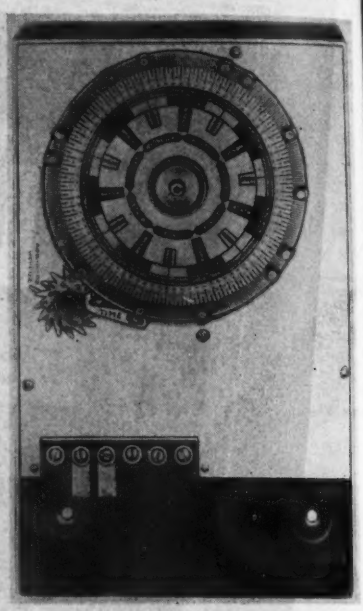
ber, concrete or wood—is provided by "Plasti-Kote," according to the manufacturer's statement. This new liquid "cellophane" finish requires no waxing; it is non-skid and long wearing, and requires no skilled labor to apply.

Applied with cloth or brush, Plasti-Kote goes on smoothly and dries rapidly. It is available in colors, and transparent.—*Utica Plastic Coating Co., Oriskany and Broadway, Utica 2, N. Y.*

• • •

Time Switch

Designed to time automatic heat, ventilation, lighting, pumping or flushing operations, the Paragon 700 Series 7-day calendar dial time switch has a 6-in. calendar dial which makes one complete revolution every 7 days. Dial trippers can be independently set for



different daily "on" and "off" schedules, and settings can be made in advance for an entire week.

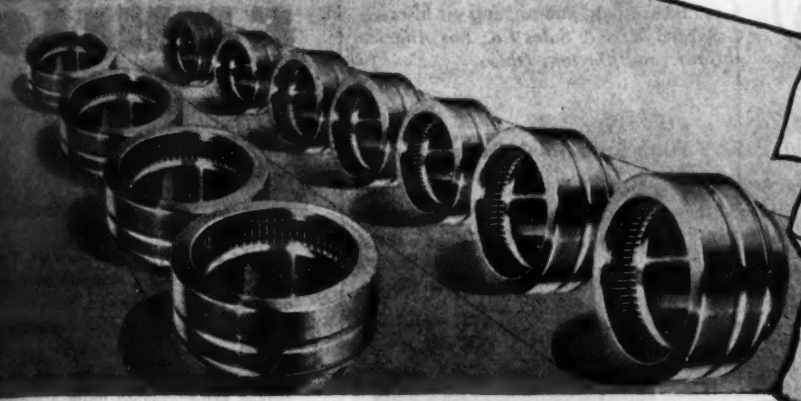
Each day of week is clearly separated from other days; graduated into hours and half hours; day and night distinctly separated. Operations from "on" to "off" can be set as close as three hours apart and can be separately adjusted throughout each 24-hr. day in the week.—*Paragon Electric Co., 39 West Van Buren St., Chicago 5, Ill.*

• • •

Fire Pump-Electric Generator

One of the first conversions of the famous "Jeep" engine for industrial use is a combination fire pump and electric generator set. The engine is the power unit for a fire pump, coupled to the front, and a 2,500-watt DC generator is flange-mounted to the flywheel housing. The pump delivers 250 gpm. at 100 lb.

PRECISION



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Precise standards have been set up by R B C Engineers to secure strict uniformity in the manufacture of R B C Needle Bearings. These standards involve twenty-five years of bearing inventiveness as applied to design, application and production.

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Each size group of R B C Bearings is as alike as two peas in a pod, not only in appearance, but more important in the vital load-carrying units that insure even load distribution. There can be no "lazy relations" in Aircraft, Machine Tool, Pump or Diesel Engine Bearings—each part must do its share of the work.

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R B C has many special machines and instruments manned by a large percentage of our personnel devoted to the job of inspection. This may be called "Ejecting lazy relations," but the result of this manifold police job is the R B C Bearing which is guilty only of punctilious accuracy.

R B C's ENGINEERING STAFF WILL HELP YOU IN SELECTING THE RIGHT BEARING, AND IN FOLLOWING OUT THE CORRECT BEARING PROCEDURE. LET US KNOW YOUR PROBLEMS.

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"the economical way"

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The indisputable *economy of operation*, that is peculiarly a *Peerless feature*, is not just a happenstance. The ingenuity of top-notch engineers, the unusual skill of precision-minded, highly-trained pump building mechanics working with *better materials*, plus years of painstaking laboratory and field tests alone were the factors responsible for not only the marked economy, higher sustained efficiency and greater dependability of every Peerless pump, but also the fact that Peerless products are from the factories of the world's largest manufacturer of deep well Turbine pumps.

Experienced Pump Engineers to assist you

The Peerless Pump Distribution Organization, a member of which will be found in your near neighborhood, is composed of the most efficient and dependable pump men in the country today. Cooperating with our own factory-trained field engineers, they stand ready to offer you of their wide experience and skill.

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TURBINE, HI-LIFT and HYDRO-FOIL TYPES

PUMPS

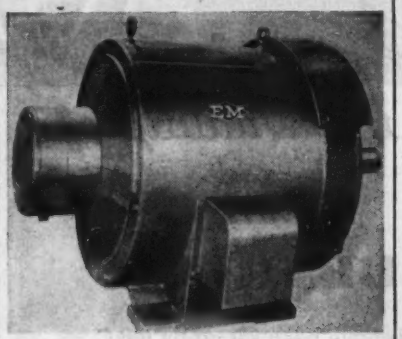
pressure; the generator supplies light and auxiliary power.

Many safeguards have been incorporated in the unit. The engine starts and stops by remote control. Additional conversion equipment includes a bronze raw water pump, water-cooled crankcase pan, and air and oil filters.—*Bardco Mfg. & Sales Co., Los Angeles, Calif. and Dayton, Ohio.*

• • •

High-Speed AC Generator

Of standard drip-proof construction, a new line of high-speed AC generators is available in sizes 18.7 to 125 kva.; 1,800 to 514 rpm.; standard voltages; 1, 2 or 3 phase; 50 and 60 cycles.



Supplied as 2-bearing units for belted or coupled duty, or single-bearing for direct coupling to driving engine, these generators are also available as "packaged" units.

A suction-type fan at the drive end of the generator pulls a large volume of ventilating air through both the direct-connected exciter and the generator, eliminating interior hot spots. The exciter is of quill type—*Electric Machinery Mfg. Co., Minneapolis 13, Minn.*

• • •

Paint Pump

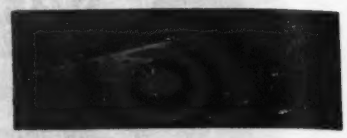
Designed to supply up to five spray guns simultaneously, the R.M.S. Junior Model paint pump delivers paint, thinner, oils and similar spray painting materials to the guns under controlled pressure, without use of a pressure pot.

The pump can work directly from original containers as well as from the standard 10-gal. container provided with the pump. There is no pressure on the container which can be refilled without stopping spraying operations.

The compact unit, 32 in. high overall and 15½ in. in diameter, weighing 45 lb., is furnished with an air surge chamber, air regulator, pressure gage, and air material line valves with standard spray fittings.—*Stephenson Air Brush Paint Co., 1630 Webster St., Oakland 12, Calif.*

ASD ★ BOLTED ★ SECTIONAL STEEL

BARGES & HULLS



Widely used by Allied Armies. Prefabricated sections shipped by truck or rail, and overseas as hold cargo. Assembled easily by unskilled personnel at site of use. Liquid or dry cargo. 500 tons up. Outboard motor makes self-propelled units.

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Backed by 40 years of dredge engineering and operating experience. Complete, integrated units. Dipper and clamshells ¾ yd. up. Hydraulic dredges 8 inches up. All dredges have bolted sectional steel hulls. May be shipped to remote sites and relocated after project is completed.

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You don't need a crystal ball to know how your equipment will be operating in the future—if that equipment is Gardner-Denver. For every type and size of Gardner-Denver equipment has been proved in the toughest service—under the most exacting conditions—to give years of dependable service.

Designed and built by men who have a thorough, practical knowledge of their fields and the problems involved, Gardner-Denver equipment is a favorite with men who use it . . . and men who own it!

★ ★ ★

Gardner-Denver "all-weather — all-water cooled" portable compressors operate efficiently in all types of weather and altitude extremes . . . deliver cooler air at lower cost.

★ ★ ★

Gardner-Denver Sinking Drills are designed to deliver more footage per shift with less operator fatigue. Gardner-Denver Paving Breakers and Spaders are built for service, long life, and for a variety of uses. Gardner-Denver Wagon Drills are extremely maneuverable, permit fast, accurate spotting of holes.

★ ★ ★

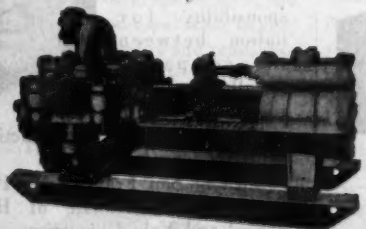
More efficiency for mechanical tamping and new operator comfort and convenience are assured by the Gardner-Denver Backfill Tamper. And for grouting service, the rugged Gardner-Denver Grout Pumps are unequalled for long life and dependable service.

★ ★ ★

Choose the equipment that suits your needs and remember the Gardner-Denver symbol means better service, outstanding performance, economical operation . . . without guesswork.

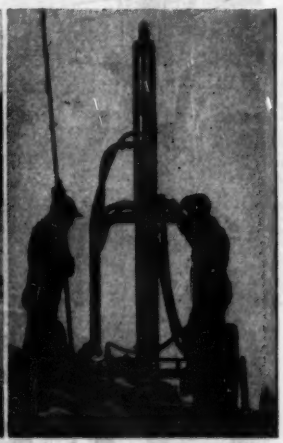
Gardner-Denver All Water-Cooled Portable Compressor

Gardner-Denver Spader | Gardner-Denver Sinking Drill | Gardner-Denver Paving Breaker



Gardner-Denver Grout Pump

Gardner-Denver Backfill Tamper



Gardner-Denver Wagon Drill

For complete information and specifications on Gardner-Denver construction equipment, write Gardner-Denver Company, Quincy, Illinois.

GARDNER-DENVER

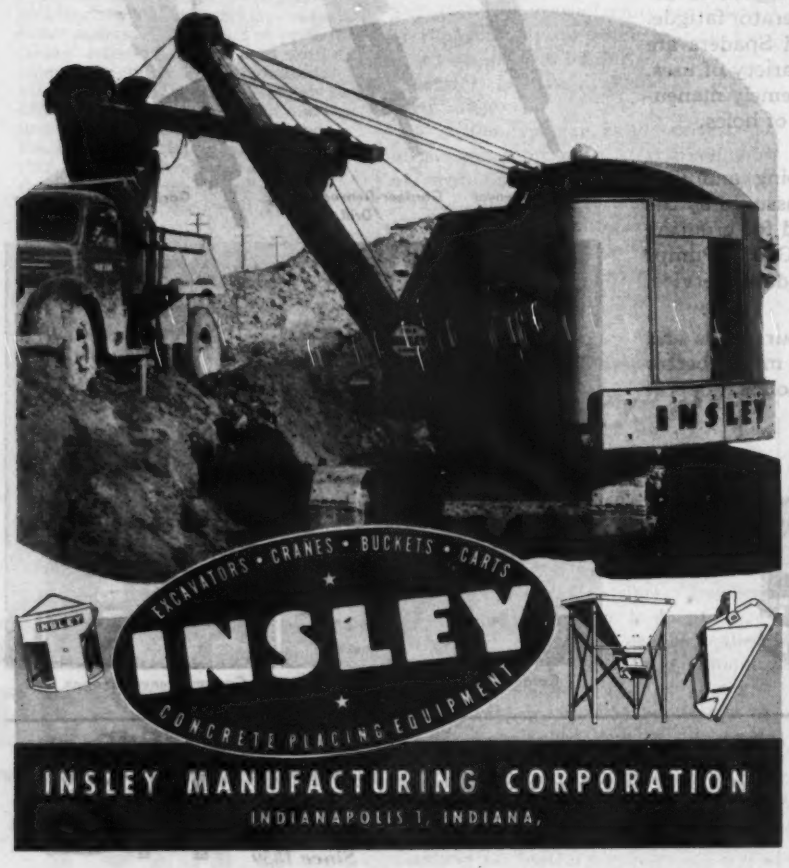
Since 1859

Safer ON SOFT SOIL

The Insley Excavator's long, wide crawlers—self-cleaning and individually controlled—assure safe operation on soft soil . . . keep the job moving at top speed.

This is one reason why Insley equipment has done such an outstanding job on the fighting fronts . . . one reason why all the dirt moving and material handling equipment we can build is going to our armed forces.

Against the day when new 3/8 and 1/2-yard Insley Excavators, Draglines, Cranes and Trench Hoes will again be available for civilian operators, we suggest that you investigate Insley's application to your job.



Manufacturers' Activities

The Wickwire Spencer Steel Co., has announced three changes in its plant operating personnel. M. G. Werme, formerly superintendent at the Clinton, Mass., plant, has been appointed chief development engineer. Gordon Lloyd has been made superintendent at the Clinton Plant, and Victor Chartner has been appointed chief mechanical engineer.

Mr. Werme has been associated with Wickwire Spencer for the past twenty-five years, nineteen at the Clinton plant. He will make his headquarters at the Buffalo plant.

Mr. Lloyd was formerly power and fuel engineer for the Carnegie Illinois Steel Corp. and chief engineer of the Loftus Engineering Corp., Pittsburgh.

Victor Chartner was previously with the Pittsburgh Steel Co., since 1930 as chief engineer. His long record in the steel industry includes also service with the Otis Steel Co. of Cleveland, the Pittsburgh Crucible Steel Co. of Midland, Pa., the Benson Mines Co. of New York, and the Jones and Laughlin Steel Co. Mr. Chartner will make his headquarters at Buffalo.

WILLIAM B. GIVEN, JR., president of American Brake Shoe Co., has announced the appointment of Robert Boyd Parker as assistant to the president for sales research and coordination, and responsibility for liaison between the company's metallurgical and research laboratories and the sales and production staffs of its 59 plants.

Born in San Francisco in 1911, Mr. Parker is a graduate of Hotchkiss School and Yale University.

JAMES M. BRODBECK, district manager, Welsbach Street Lighting Co., New York, has been appointed division manager, Chicago, according to an announcement by Morse DellPlain, president. Mr. Brodbeck will supervise in

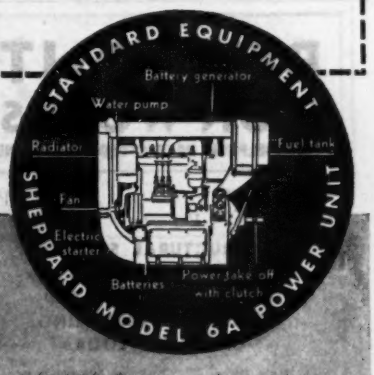
GRAPHITE MILL USES WORLD'S THRIFTIEST POWER COMBINATION

WATER POWER is economical . . . but unreliable. This graphite mill supplements water power with four Model 6 Sheppard Diesels which take over when water level falls or the stream freezes up. The combination feeds a steady supply of low cost power to the mill's machinery at all times. Despite the severe service conditions created by the constant presence of graphite dust, the Sheppard Diesels are always "ready to go."

Complete dependability and readiness to go into action at any minute are assured by Sheppard Diesel's oil cooled pistons...hardened, replaceable cylinder liners . . . 4% governor regulation . . . simplified fuel injection system.

If you want to learn how low in cost dependable power can be, learn about Sheppard Diesels. Some of these engines are now available on priority to essential industries. Sheppard engineers will be glad to make recommendations suited to your present or post-priority needs. Write today, stating your requirements.

SHOWS WAY TO CUT GENERATING COSTS. Handy, file-size folder . . . just published . . . gives valuable information about Sheppard Diesel Generating sets. Compact . . . time-saving . . . no pages to leaf through! Quantity is limited . . . so write for your copy today.



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Sheppard
ALL AMERICAN
DIESELS

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INSERTING VALVES

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NO SHUT-DOWNS NECESSARY!

Water shut-offs mean Industrial shut-downs, and this in turn impedes the war effort. These shut-offs are not necessary when a valve insertion is made.

With a Smith Valve Inserting Machine you can insert valves with the service at full pressure. These machines are made in 6 sizes for inserting 4" to 36" valves, are simple and easy to operate and do a surprisingly quick, clean job.

Showing a 24" valve installed horizontally under pressure.

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POWER SHOVELS AND CRANES

THE BYERS MACHINE COMPANY
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DISTRIBUTORS THROUGHOUT THE WORLD

Chicago, St. Louis, and Kansas City the operations of the company, a subsidiary of the Welsbach Engineering and Management Corp. James R. Campbell, assistant manager, New York, has been appointed district manager to replace Mr. Brodbeck.

THE HEIL CO., Milwaukee, Wis. has appointed William E. Simons as sales manager of the body and hoist division. Mr. Simons was with Ford Motor Co. for over 26 years, serving as manager of branches throughout the country. He resigned as deputy regional director of the War Production Board to become associated with The Heil Co., in October, 1943. Since then he has been in charge of the materials division. The former body and hoist sales manager, Earl C. Gilmore, has been advanced to assistant treasurer of The Heil Co.

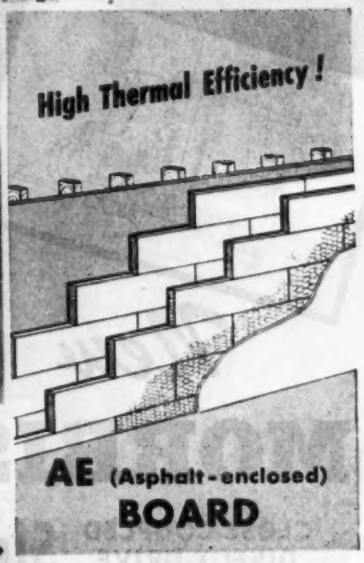
APPOINTMENT of William P. Michell as assistant chief engineer of Mack Trucks, Inc., has been announced. He recently returned from England where he had been serving in an advisory capacity on military truck transport.

Mr. Michell began his engineering career with the Whitlock Co. in Hartford, Conn., before going overseas as a first lieutenant in World War I. After the war he returned to Whitlock, eventually going with Ace Motor Corp. as shop superintendent. He joined Mack in 1923 as a shop engineer and through a series of promotions became assistant to the chief engineer in 1937. A graduate of the University of Pennsylvania. Mr. Michell is a member of the American Society for Testing Materials, and a professional engineer of Pennsylvania.

GEORGE W. PHILLIPS has been appointed superintendent of industrial relations at the Fairfield, Ala., sheet mill of the Tennessee Coal, Iron & Railroad Co. He was formerly assistant superintendent of industrial relations at the Gadsden Works, Republic Steel Corp.

ARCHIBALD A. WARNER has been elected president and general manager of the Rockford Drilling Machine Di-

★locker-plant insulation



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FIBERGLAS*

Locker-plant operators now planning additions or new construction owe it to themselves to investigate the advantages of Fiberglas AE Board. This unique low-temperature insulating material is made of fine glass fibers, compressed and treated with a thermosetting binder, and completely enclosed with an asphalt coating. The myriad of air spaces between the close-packed fibers give it remarkable insulating efficiency.

Cold-room insulation must be odorless—and it should not absorb odors. Fiberglas is glass—glass fibers that have no odor, absorb no odors in service. Furthermore, both the binder and the asphalt enclosure are odorless under cold conditions.

This product will not rot or decay and offers no sustenance for insects, vermin and rodents.

The asphalt facing of Fiberglas AE Board gives it the rigidity and strength needed for easy handling and installation and also helps to provide a more efficient vapor barrier which is so important in cold storage installations.

Protect your investment. Specify Fiberglas Insulations installed to conform with Commercial Standards CS 105-43, copy of which will be sent gladly on request. *Owens-Corning Fiberglas Corporation, 1840 Nicholas Building, Toledo 1, Ohio. In Canada, Fiberglas Canada Ltd., Oshawa, Ontario.*

Other FIBERGLAS Low-Temperature INSULATIONS

1. Type TW-F Wool—in roll, bat, bulk and shredded forms is a soft, resilient, lightweight insulation suitable for all types of applications and all temperatures from sub-zero to 1000° F.

2. Type PF (Pre-Formed) Insulation—these 24″ x 48″ boards are widely used for domestic and commercial refrigerators, display cases, coolers and other low-temperature equipment. Available in thicknesses from 1″ to 4″, in 4 degrees of rigidity and in densities from 2½ to 9 lbs. per cubic foot.

3. Type PF Pipe Insulation—offers a convenient, efficient method of insulating brine pipes and other cold lines when installed as specified. Available in 3-foot sections for all standard pipe sizes up to 30″ diameter.

★ ★ ★

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Costs Less;
Weighs Half as Much;
Needs Less than
Half the Space...

New

MORRIS Vertical

CLOSE-COUPLED DIRECT-DRIVE Slurry Pump

Offering the same hydraulic passages and pressure-balanced impeller as the standard Morris horizontal slurry pump, this Morris Vertical Type S-VC . . .

1. **Is considerably lower in cost.**
2. **Weighs half as much.**
3. **Requires less than half the floor space.**

Mounted on the extended motor shaft, the impeller is designed for the smoothest possible flow. Its pressure balanced feature prevents circulation of abrasive solids between the impeller and the backplate, greatly decreasing wear.

For neutral and mildly caustic liquors, the motor shaft is protected by a shaft sleeve through the stuffing box. For acid mixtures, an integrally cast impeller and sleeve is threaded directly to the shaft. The sleeve covers the entire shaft when complete shaft protection is required. Pump parts are furnished in a wide variety of commercial alloys, depending upon the service. The entire unit contains only two bearings—special *heavy-duty* type. Located in the motor, these eliminate pump bearing maintenance, and contribute to long pump life and uninterrupted service.

Standard sizes from 1½" up to 6" are designed for motors up to 50 H.P. Larger horsepowers usually require horizontal pumps. Write today for complete specifications and performance curves.

MORRIS MACHINE WORKS
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MORRIS CENTRIFUGAL PUMPS

vision of Borg Warner, Rockford, Ill. Mr. Warner succeeds E. C. Traner, retiring after 25 years as director of the division to become chairman of the supervisory board.

MATTHEW P. McCULLOUGH, for many years treasurer and a director of the Masonite Corp., has been appointed president, succeeding the late Ben Alexander.

Charles J. Winton, Jr., also a director, was named to succeed Mr. McCullough as treasurer, and John M. Coates was appointed a director.

The new president is widely known in the lumber and allied industries, with which he has been associated throughout his business career. He has been treasurer of the Masonite Corp. since 1928, and is also chairman of the board of the Employers Mutual Liability Insurance Co., president of the Alexander & Yawkey Lumber Co., Prineville, Ore., and a director of the Marathon Corp., Wausau, Wis.

LE ROI CO. Milwaukee, Wis., manufacturers of portable air compressors, internal combustion engines, and engine-driven generator sets, announces the advancement of Norman M. Sedgwick from assistant manager of compressor sales to sales manager of that division, succeeding Donald Heffron, resigned.

Mr. Sedgwick has been with the company over sixteen years, serving in various capacities in shop, field service, purchasing, and sales departments. Recently he has worked with the U. S. Engineer Corps in servicing government compressor contracts.

ANNOUNCEMENT is made by Harnischfeger Corp., Milwaukee, Wis., of the recent appointment of Municipal Machinery Co., Coram, N. Y., as distributors of P&H excavators and truck cranes for Suffolk County, N. Y.

THE ADVANCED CONCRETE ROAD CURING CO. of New Haven, Conn., has announced the appointment of John G. Gasteiger as sales manager. He was recently released from the War Department, New York Ordnance District, where he was disposal advisory officer.

The Forest Industries Blaze New Trails

Opening of TECO Wood Products Development Shop AND Wood Chemistry Laboratory

TECO Chemistry Laboratory. TECO chemists are here shown working on lignin derivatives.

200,000 lb. Baldwin-Southwark testing machine in the TECO Shop. Material undergoing test is a small wood column being tested in compression.

Timber Engineering Company announces the opening of its Wood Products Development Shop and Wood Chemistry Laboratory located in Washington, D. C.

The Wood Products Development Shop has a full scale testing rig equipped to handle trusses up to 50′ span; auto-claves and other equipment used in pressure treating; dry kiln and high pressure steam equipment for impregnating; and other facilities for determining the physical and mechanical properties of wood and wood products.

The Wood Chemical Laboratory has modern equipment for investigations in wood chemistry and wood derivatives research. It is giving special attention to lignin research including adhesives, synthetic plastics, etc.

If you have any problems in respect to the physical, mechanical and chemical properties of wood, the technical staff of the Timber Engineering Company may be of assistance on a moderate fee basis. If its own facilities will not solve your problem, it will assist you in locating sources which can.

Consultations at our Washington office may be made by appointment and without obligation on your part. Write us on your business letterhead stating your wood utilization problem.

TIMBER ENGINEERING COMPANY OF WASHINGTON, D. C.

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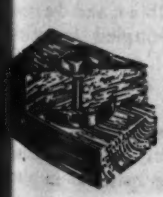

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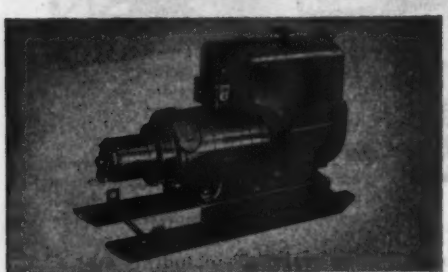

MASTER GAS-ELECTRIC GENERATING PLANTS

COMPACT PORTABLE

SAVE TIME AND SPEED WORK WHEREVER POWER OR LIGHTING IS REQUIRED

Eleven basic sizes from 500 watts to 17,000 watts and 30 different types to meet all AC or DC power or lighting requirements. Housed or open models . . . available with wheelbarrow, buggy or trailer mounting. For operating a single tool or motor, or floodlight . . . or gangs of tools, groups of motors, or lighting entire areas. Easy to put in operation . . . economical to operate and maintain. Compact, portable, self-contained.

For complete details write for Bulletin 594.

MASTER VIBRATOR COMPANY

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Products Include: Concrete Vibrators, Gas or Electric Spud Vibrating Attachments, High Speed Tools • Vibratory Concrete Finishing Screeds • Rotary Concrete Floor Finishing Machines • Portable Gas Electric Generator Sets 500 Watts to 17,000 Watt Voltage Regulators and Remote Mounting Options • Vibrator Equipment Trailers • Electric

Manufacturers' Publications

Armco Design Aids—Two helpful folders are available for postwar planners. They catalog briefly the problems confronting highway engineers and municipal officials in connection with postwar plans and construction and illustrates the application of Armco steel products to the solution of many construction problems.—*Armco Drainage Products Association, Middletown, Ohio.*

Arc Welding Design—Eight new sheets of suggestions on practical design for arc welding and a vestpocket guide for welders have been issued. They are thoroughly illustrated and contain handy reference information.—*The Hobart Brothers Co., Troy, Ohio.*

Resistance Welding—A 60-page book contains scores of illustrated examples of resistance welding applications. It is a guide to a wide variety of uses whether it be single spot or multiple spot, seam or flash, butt or projection welding, and whether the work is to be brought to the machine or the equipment brought to the work.—*Progressive Welder Co., 3050 E. Outer Drive, Detroit 12, Mich.*

Vibratory Finishing Screed—This folder emphasizes the unusual speed and economy of a vibratory finishing screed. Some of the applications listed are: highways; airport aprons, runways and hangar floors; warehouse floors; dock decks; street paving and sidewalks; bridge decks and canal inverts. Models are available in adjustable widths up to 26 ft. Outstanding features are strike-off and compaction in a single operation and uniform vibration throughout length. Copies are available in both English and Spanish.—*Master Vibrator Co., Dayton 1, Ohio.*

Arc Welding Electrodes—A new bulletin on arc welding electrodes gives a complete description of each electrode in the company's line, and also includes separate charts on physical properties of weld metal for each electrode, as well as on recommended current values. The electrodes are of both a-c and d-c types and are easily identified by official AWS classification numbers.—*Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.*

Structural Welding Tool—A simple all-purpose structural tool for aligning, fairing, and holding material in place

The Weasel is a development by The Studebaker Corporation, whose collaboration on it with the Office of Scientific Research and Development and the Ordnance Department, Army Service Forces, goes back to May 1942.

THROUGH heavy snow, thick mud, swamp land or on improved highways, the Weasel skims over the ground with amazing speed. It is a reconnaissance car, a troop carrier, a light truck, a tow car --all in one. In secret production more than two years, hundreds of Weasels have helped confound the enemy with their swiftness and maneuverability in the Aleutians, Italy, France, the Lowlands, and Germany itself.

Secret of the Weasel's ability to perform even where most vehicles stall is the broad area of its two semi-flexible treads of Yoloy steel, running the full length of the body, and the specially engineered, independent suspension of Youngstown alloy steel springs. Clever engineering and use of Yoloy permit such unusually light-weight construction, that the pressure on the ground exerted by the Weasel is only one-fourth that of a fully equipped infantryman.

Besides Yoloy for tracks and alloy for springs, the Weasel is built with many hull and chassis stampings of Youngstown Carbon Steel. Whether you need Yoloy, the high-tensile nickel-copper alloy steel that's ideal for light-weight construction and extra-tough jobs, or alloy or carbon steel for the more conventional uses, remember that Youngstown is ready to serve you NOW - in war or in peace.

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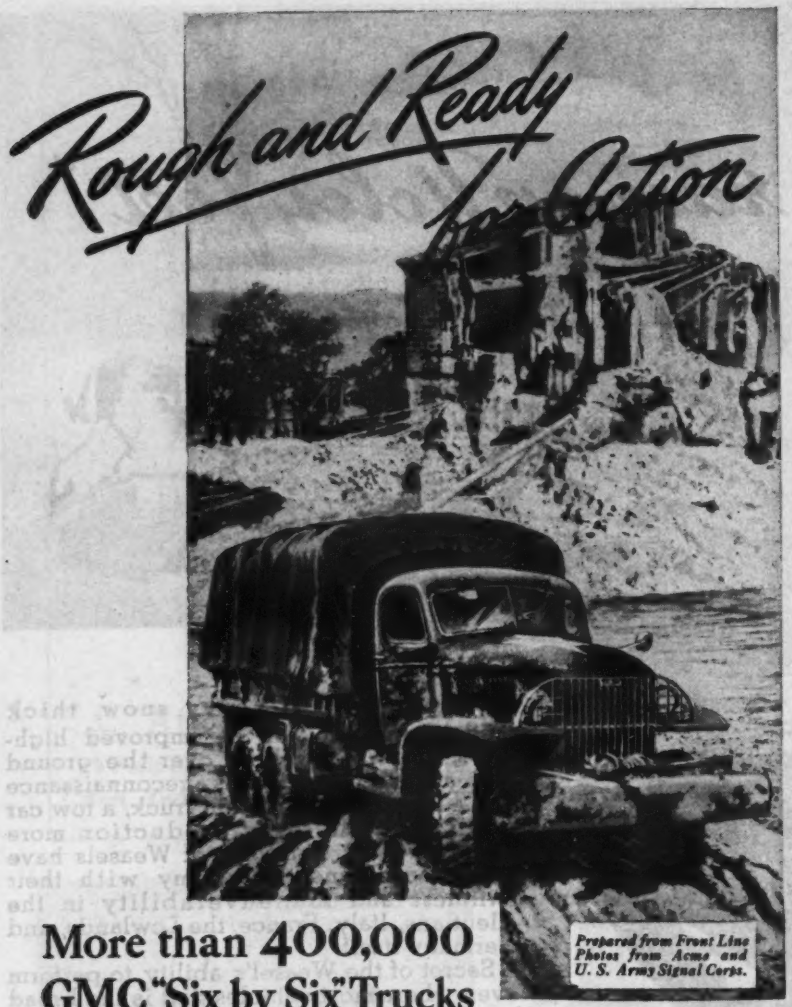
YOUNGSTOWN 1, OHIO

Manufacturers of

Carbon, Alloy and Yoloy Steels

YOLOY YOUNGSTOWN STEEL

Pipe and Tubular Products-Sheets-Plates-Conduit-Bars-Electrolytic Tin Plate-Coke Tin Plate-Rods-Wire-Nails-Tie Plates and Spikes-Alloy and Yoloy Steels.



Prepared from Front Line Photos from Acme and U. S. Army Signal Corps.

More than 400,000 GMC "Six by Six" Trucks for Our Armed Forces

There's nothing beautiful about this mud-splashed, war-worn Army truck. But *beauty is as beauty does*, and more of these sturdy 2½-ton GMCs are performing more duties for our Armed Forces than any other type of vehicle.

They go ashore with Army Engineers and Navy Seabees, helping to build bases and bridges and bomber strips on newly won territory. They are used by the Air Forces to transport bombs, gasoline and repair equipment. They serve as prime movers for the Artillery's 75 mm and 105 mm guns. They power machine shops for Ordnance and mobile radio stations for the Signal Corps. They transport complete surgical operating units and optical shops for the Medical Corps. They carry countless loads of food and fuel, munitions and materials for the Army Service Forces.

In fact, wherever and whenever Allied Armies need truck transport or truck power, you'll usually find another Army of GMC "six-by-six" trucks, *Rough and Ready for More Action.*

In addition to producing thousands of military trucks and amphibian "Ducks," GMC is now manufacturing several thousand commercial trucks for use in essential civilian occupations. If you are eligible for a new truck, see your GMC dealer first for "The Truck of Value." Remember, too, that he is headquarters for the original truck-saving Preventive Maintenance

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for welding is described in a 32-page booklet which illustrates several specific uses of the tool. Added uses are given in a sheaf of 43 work sheets.

The flexible and wide scope of applications of this tool, called "Jack Clamp" can be applied to all types of structural steel fabrication with speed and economy. Special uses will be found in tank, pipe and other steel plate work.—*Welding Tools & Engineering Co., Douglasville, Ga.*

Hot-working of Metals—How "hot working" improves quality of metal is described and illustrated in a 40-page booklet issued recently by the technical committee of the Drop Forging Association. It is intended for users of forgings, instructors in engineering and metallurgy, designing engineers, metallurgists, and production and management executives. Dealing broadly with characteristics of forging materials, the booklet features steel and, in not-too-technical language and by means of more than 200 halftones and diagrams, gives a clear understanding of how this metal gains in strength and toughness progressively through hot-working operations, from ingot to finished forging.—*Drop Forging Ass'n, 605 Hanna Bldg., Cleveland, Ohio.*

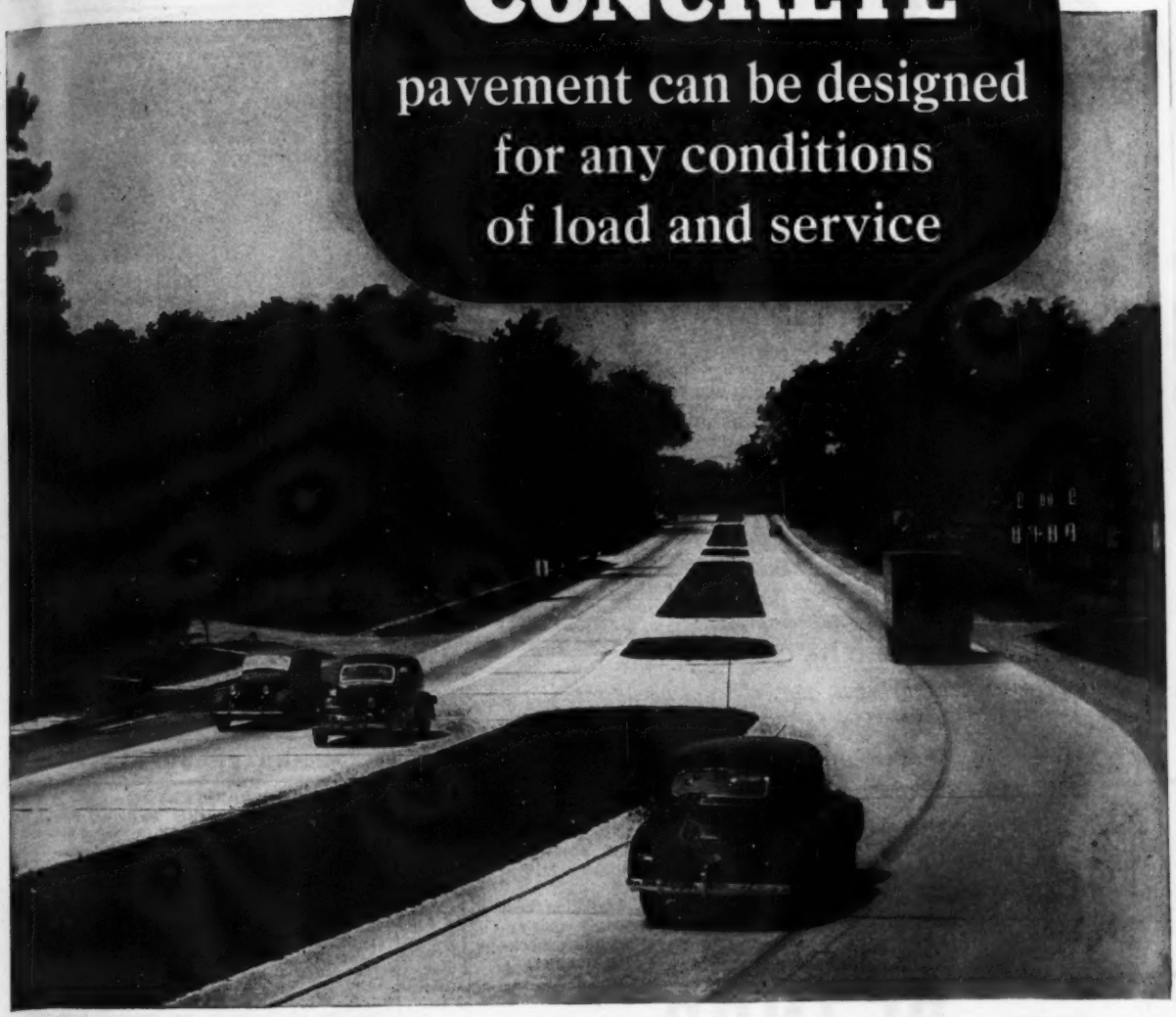
Conduit Systems—In addition to comprehensive descriptions of the manufacturer's products, this 12-page booklet contains a great deal of information for engineers, architects and heating contractors concerned with the problem of insulation and protection of piping—either underground or overhead. Capacity tables, trench dimensions and general specifications are included for prefabricated insulated pipe units and for tile or cast iron conduit systems.—*The Ric-wil Co., 1572 Union Commerce Building, Cleveland, Ohio.*

Refractories—A folder that gives information concerning refractories produced from highest quanity flint and plastic clays, and also information about insulating fire brick and high temperature bonding mortars. — *Harbison-Walker Refractories Co., Farmers Bank Building, Pittsburgh 22, Pa.*

Flat Spray Nozzles—A new folder tells of nozzles in service in practically all industries where water is used in cleaning, cooling and washing. They are made in a variety of sizes and from a variety of materials. The folder besides illustrating and describing the nozzle uses gives tabular information concerning their discharge in gallons per minute; their dimensions; a list of materials, sizes and prices.—*Chain Belt Co., Milwaukee, Wis.*

CONCRETE

pavement can be designed for any conditions of load and service



Concrete with its all-season strength to "take it" is the ideal pavement for roads, streets and airport runways.

Concrete pavement can be designed efficiently for any weight and volume of traffic, with neither wasteful over-design nor costly inadequacy.

Concrete pavements which are so designed, carry their traffic safely for years with a minimum of maintenance expense.

This demonstrates the basic superiority of concrete pavement, the ability to render uninterrupted service at low annual cost—the true measure of pavement economy.

Concrete pavement correctly designed, usually *costs less* than any other pavement of equal load-carrying capacity.

Write for information on latest portland cement concrete pavement design for roads, streets or airports.

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A national organization to improve and extend the uses of concrete . . . through scientific research and engineering field work

BUY MORE WAR BONDS

Gas-fired
REZNOR UNIT HEATER

A Complete Self-Contained Heating Plant

Pay Only For Heat You Use

With a Reznor, you have heat when you want it — where you want it.

Automatic control with thermostat or hand control.

Reznor makes a heater for any size area. Storeroom, bowling alley, factory, or office ... no matter what size or shape of area, Reznor has a heater for the application.

Note To Dealer ... *We have just issued an easy-to-read data sheet showing dimensions, volume, sizes of gas connections, shipping weight, and other useful data. You can get copies by writing to the Reznor Manufacturing Company, Mercer, Pa.*

Due to wartime shortages, you may not be able to get your Reznor immediately. On future orders, we regret to announce that we cannot offer any definite delivery promises.

To conserve space, you can suspend the Reznor Unit Heater.

Installed in a jiffy by a competent Reznor dealer or your own plant men.

Gas-fired, provides clean, comfortable, healthful heat.

Low installation cost — no maintenance except for a quick check-over each summer.

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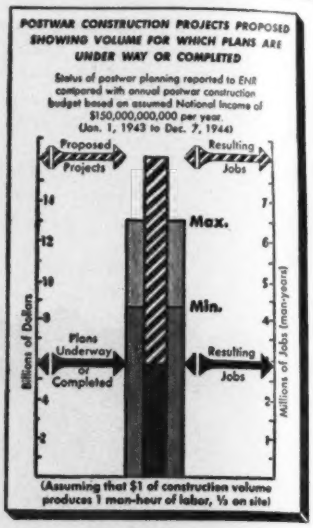
POSTWAR PROJECTS


POSTWAR CONSTRUCTION PROJECTS PROPOSED SHOWING VOLUME FOR WHICH PLANS ARE UNDER WAY OR COMPLETED
Status of postwar planning reported to ENR compared with annual postwar construction budget based on assumed National Income of $150,000,000,000 per year (Jan. 1, 1943 to Dec. 7, 1944)
Proposed Projects
Resulting Jobs
Max.
Min.
Plans Underway or Completed
Resulting Jobs
Billions of Dollars
Millions of Jobs (man-years)
(Assuming that $1 of construction volume produces 1 man-hour of labor, ½ on site)

Projects proposed for postwar construction have been published in these columns since January, 1943 as they have been reported to ENGINEERING NEWS RECORD.

Statistics based on these reports are used by the Committee on Postwar Construction of the American Society of Civil Engineers to measure the progress of plans for postwar projects.

The chart above shows, both in estimated dollar volume and in jobs or man-years of labor, how fast this reservoir of future work is filling up.

WATER SUPPLY

PROPOSED WORK

Ill., Steger—City, City Hall, M. Pennington, supt. P. Wks., imprv. water distr. sys. $15,000.

Ill., Waterloo — City, O. A. Reis, supt. Water Dpt., City Hall, preliminary sketches addnl. watermain, $10,000; standpipe, $15,000.

★**Mich., Battle Creek** — City, N. G. Damoose, dir. Pub. Serv., City Hall, watermains, $100,000; water conditioning plant, $1,200,000.

★**Mich., Jackson**—City, A. J. Koenig, mgr., City Hall, water softening plant. $4,500,000.

N. C., High Point—City, City Hall, installing 16- to 24-in. watermains, $300,000.

O., Hopedale — Village, L. T. L. Davis, mayor, City Hall, approved bond issue construction, imprvs. WW sys. $300,000.

Tex., Brownsville — City, water imprvs. $75,000.

Tex., Denison—City, City Hall, water imprvs. $50,000.

Alta., Compuxville (Peace River Dist.)—Municipality, WW sys. $50,000.

Alta., Fahler (Peace River Dist.)—Municipality, water supply. $25,000.

Ont., Elora—Council, Reeve H. Walser, chn. Com., City Hall, WW sys. $25,000-$35,000.

Ont., Ramore—Municipality, WW sys. $35,000.

Sask., Druid — Rural Municipality of Winslow, V. L. M. Dammann, secy., WW sys. $25,000.

PLANS UNDER WAY

Ark., Sloam Springs — City, City Hall, plans completed filtration plant and 3 mi. water line and dam. $200,000. Financing not provided. H. T. Lawrence, 1502 N.W. 21 St., Oklahoma City 6, Okla., consult. engr. and archt.

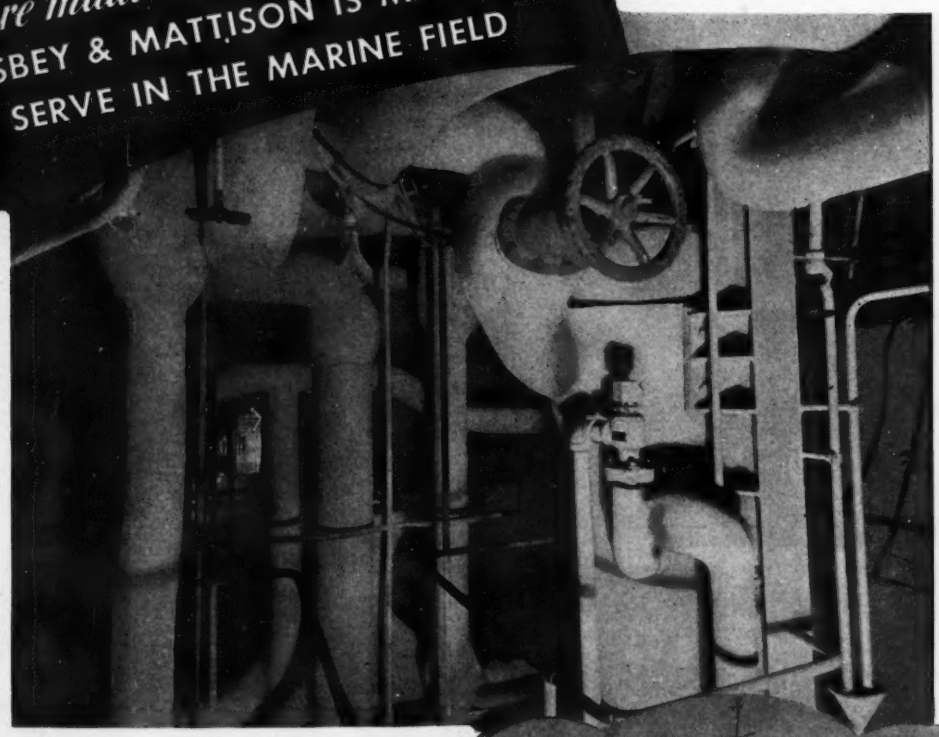
Calif., El Centro—City, 142 S. 6 St., filter plant, $120,000; lining settling basins, $48,000; reconditioning watermains, $45,000; cathodic protection, $3,000. Financing not provided. E. Paul Ford, 142 S. Sixth St., dir. P. Wks. and city engr.

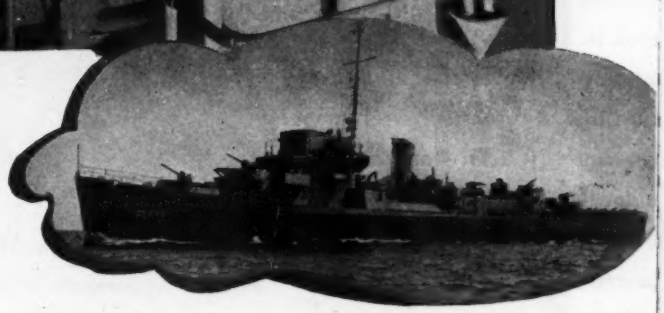
Calif., Glendale—City, City Hall, plans under way foothill water line installation, $296,000. J. C. Albers, City Hall, city engr. and street supt.

Calif., Pomona—City, City Hall, plans 50% completed replacing watermains. $150,000. F. C. Froehde, city engr.

Nature made Asbestos HERE IS HOW KEASBEY & MATTISON IS MAKING IT SERVE IN THE MARINE FIELD

USS "Bunch" a Destroyer-Escort Vessel, built by the famous "Defoe Roll-over Process" by the Defoe Shipbuilding Company, Bay City, Michigan. Keasbey & Mattison heat insulations installed by the Armstrong Cork Company.





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Keasbey & Mattison Asbestos products have seen extensive service in the Marine Field during the war. The above example is typical. The intricate network of steam lines, which are an essential part of the DE'S power plant, are completely insulated with K&M "Featherweight" 85% Magnesia and K&M Hy-Temp Covering.

K&M "Featherweight" 85% Magnesia Insulation is designed for temperatures up to 600°F.—Hy-Temp for temperatures to 1900°F. The proven quality and dependability that these K&M Insulations have shown at sea has also been apparent in every industrial use to which they have been put. In hundreds of plants throughout the country, these insulations are daily saving tremendous quantities of heat, fuel and power.

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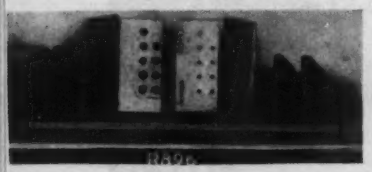
Keeping the "Cat's" Claws *In There Scratching . . . .*

One of the harshest tests of the wearing properties of metal parts was encountered in the systematic recovery of many thousand tons of steel scrap from steel plant furnace slag by The Heckett Corporation of Butler, Pennsylvania.

The working parts of the equipment for a Heckett operation



which are exposed to the slag are subjected to possibly the severest wearing action of any equipment used in industry. The slag is extremely abrasive, and only austenitic manganese steel equipment wearing parts can stand up long under the grinding, battering service. Applications of Amsco manganese steel in this equipment include dippers, crawler treads, cutting edges for the "cat" bulldozers, lifting magnet cover plates and shells and housing lips for the magnetic separators.

The Amsco manganese steel cutting edges (picture R-896) applied to the bulldozer blades are taking the hardest wear and stress in the whole process and are giving eight to ten times the life of heat-treated alloy steel edges. The manganese steel pieces cost only about two and a quarter times as much as the ordinary, so the saving is great in metal cost alone, without considering the labor and operating time saved in avoiding frequent replacements.

Picture R-141 shows corner bits for bulldozers used in road-building; parts likewise subjected to severe wear.

Picture C-388 shows one of several types of scarifier teeth to which the toughness and abrasion resistance of manganese steel give an unsurpassed service life at an economical cost.

Send for Bulletin 1143-CI.

Send for Bulletin 941-W on Amsco Conservation Welding Rods.

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POSTWAR PROJECTS (Cont'd.)

Calif., South Gate—City, City Hall, plans 50% completed concrete reservoir, $100,000. Leeds, Hill, Barnard & Jewett, Edison Bldg., Los Angeles, consult. engrs. F. E. Alderman, City Hall, city engr.

★**Colo., Colorado Springs**—City, City Hall, plans 50% completed 22 mi. water pipeline of which 50% is thru tunnels to convey water from the South Platte River in Park Co. to Colorado Springs water sys., requiring 2 pump. plants with total lift of 925 ft., concrete pipe proposed except steel pump. lines. $4,625,000. F. O. Ray, City Hall, city engr. C. C. Eastham, asst. city engr.

Ill., Benton—City, City Hall, H. Garner, supt. Water, main from water treatment plant into town, $15,000; water tower, $26,000. R. E. Vineyard, Brown Bldg., acting city engr.

Ill., Blue Island—City, City Hall, plans 50% completed 45,270 ft. 6- to 24-in. watermains, valves, hydrants and special castings. $354,635. Financing not provided. A. L. Fox, City Hall, city engr.

Ill., Forest Park—City, City Hall, plans 90% completed watermains. $160,000. Financing not provided. E. Hancock, 1509 Jackson Blvd., Chicago, consult. engrs.

Ill., Taylorville—City, City Hall, preliminary surveys made by Warren & Van Praag, Inc., engrs., Standard Office Bldg., Decatur, lake supplementing water supply. $300,000. Site not selected. J. W. Debrun, City Hall, city engr.

Ia., Boone—City, City Hall, plans 75% completed 750,000 gal. elevated tank, 5 turbine type well pumps, reline and roof surface reservoir, watermain extens., $106,000. Land rights not cleared. Pittsburgh-Des Moines Steel Co., 1015 Tuttle St., Des Moines, archts. Geo. A. Nelson, City Hall, city engr. CD 6/24/43—ENR 7/1/43.

Ia., Council Bluffs—City, City Hall, intake and waterline and reservoirs, $350,000. Financing not provided. J. Boyne, City Hall, city engr.

Ia., Dubuque—City, City Hall, A. A. Rhomberg, mgr., plans 95% completed water treatment plant, $270,000. Consoer, Townsend & Associates, 211 W. Wacker Dr., Chicago 6, Ill., consult. engrs. CD 6/15/43—ENR 6/17/43.

★**Mich., Bay City**—City, City Hall, plans 10% completed imprv. water source. $650,000. R. McGillivray, City Hall, city planner.

Mich., Coldwater—City, City Hall, plans 90% completed water conditioning plant, water metering. $183,000. Financing not provided. Shoecraft, Drury & McNamee, State Savings Bank Bldg., Ann Arbor, consult. engrs.

Mich., Ironwood—City, City Hall, plans 50% completed imprv. distr. sys., correct pump. station defects to provide for greater efficiency and economy, constructing water treatment plant, $150,000. Francis Engineering Co., Saginaw, consult. engr.

Mich., Monroe—City, City Hall, water supply, $275,000. Shoecraft, Drury & McNamee, State Savings Bank Bldg., Ann Arbor, consult. engrs. A. J. Jennings, City Hall, city engr. CD 2/25—ENR 3/9.

Mich., Muskegon Heights—City, City Hall, plans 90% completed c.i. watermains. $25,000. Financing not provided. G. Whelpley, City Hall, city engr.

Mich., Plymouth—City, City Hall, plans 20% completed c.i. pipe and standard fittings distr. sys. exten. $70,000. Legal obstacles to be overcome. Pate & Hirn, 532 Michigan Bldg., Detroit, consult. engrs. CD 10/25—ENR 11/16.

★**Mich., Port Huron**—City, City Hall, plans 25% completed WW. $1,100,000. Ayers, Lewis, Norris & May, Ann Arbor, consult. engrs. A. T. Carlisle, City Hall, acting city engr. CD 2/14—ENR 2/24.

Mich., Ypsilanti—City, 113 Pearl St., plans 50% completed enlarging filter plant, $185,163. Shoecraft, Drury & McNamee, State Savings Bank Bldg., Ann Arbor, consult. engrs. T. F. Older, 13 Pearl St., city engr. CD 10/25—ENR 11/16.

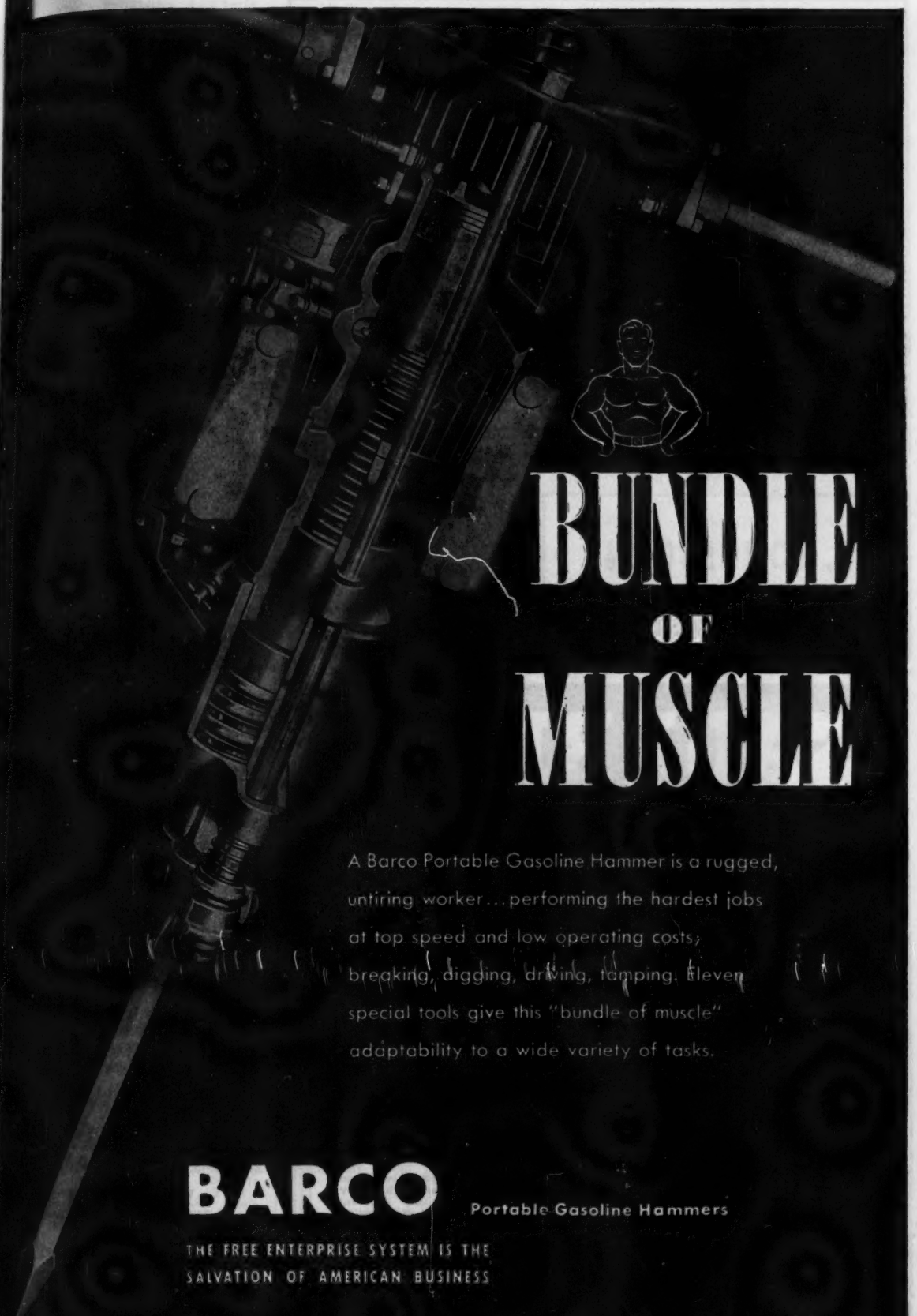
New York—Dpt. P. Wks., State Office Bldg., Albany, plans under way exten. water supply sys., at Jones Beach State Park, CON-27, for Long Island State Park Comn., Babylon, $20,000. Long Island State Park Comn., Babylon, engrs. CD 7/6—ENR 7/27.

N. Y., Bear Mountain — Dpt. P. Wks., State Office Bldg., Albany, Zone 1, plans under way rehabilitation water supply and sewage disposal, CON.-35, at Bear Mountain State Park, for Palisades State Park Comn., Conservation Dpt. $125,000. C. L. Bogert, 624 Madison Ave., New York, Zone 22, engr. CD 8/25—ENR 9/7.

N. D., Ashley — City, City Hall, G. D. Grosz, mayor plans 10% completed WW imprvs. $85,000. P. M. Barnes, Valley City, city engr. CD 10/28/43—ENR 11/4/43.

N. Y., Putnam Valley—Lake Peekskill Water Dist., permanent water supply, complete with standpipe, appurtenances, $300,000. J. Wilbur Irish, Peekskill, consult. engr.

N. D., Strasburg—City, J. S. Bauman, mayor, City Hall, plans 50% completed water and sewer imprvs. Financing not provided. R. Byrnes, Valley City, consult. engr. CD 9/15/43—ENR 9/23/43.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SLACKLINE CABLEWAYS ARE UNIQUE

Above picture shows a Sauerman Slackline Cableway that digs deep under water and lifts gravel to a hopper on top of a screening plant. The operating cost is only a few cents per cubic yard and the machine cleans up every yard of material within an 800-ft. radius of the plant.

WHEN you have a problem of digging any kind of material from a deep pit, river or pond, and delivering to a hopper, storage pile or other elevated point—there's nothing quite equal to a Sauerman Slackline Cableway.

This machine is a digger, conveyor and elevator all in one. It utilizes a round bottom excavator bucket that has the same powerful digging action as the buckets used on revolving dragline excavators. The bucket is chain-suspended from a carrier running on an inclined track cable and is equipped with a simple dumping device which permits automatic dumping at any point along the track cable. After dumping its load, the empty bucket is carried by gravity back to the digging point. The track cable swings around a central mast or tower in a wide arc, the radius of which may be as much as 1200 ft., and the bucket digs and delivers wherever the operator wishes within the radius.

The power unit is a special type of two-drum hoist equipped with automatic control for easy one-man operation. It provides the different speeds and line-pulls necessary for the varying duties of digging, conveying and elevating, including a speed of 600 f.p.m. for inhauling the loaded bucket. The standard bucket sizes range from ⅓ cu. yd. to 3½ cu. yd. capacity. For complete details ask for Catalog 19-C.

SAUERMAN BROS., Inc., 532 S. Clinton St., CHICAGO 7

POSTWAR PROJECTS (Cont'd.)

★**Pa., Phila.**—City, City Hall, plans completed installing water meters, $6,050,000; Master Control Bd., Cambria Sts., WW. 43, $130,000; plans completed chlorination equip., Oak Georges Hill and East Park Reservoir 31, $64,860; plans 60% completed structing preliminary and rapid sand WW. 36, $905,600 and new flocculat coagulating basins, WW. 37, $1,136,000 at Queen Lane Filtration Plant; plans completed filtered water pump. station resdale Filtration Plant, WW. 29, $1,0 plans 50% completed reconstructing drainage sys. and constructing addnl. sand filters, Belmont Filtration Plant 27, $813,600; rehabilitation Lardners Pump. Station, WW. 26, $498,000; 25% completed installing miscell. smaller mains, throughout city, WW $1,290,000; plans 20% completed reha tion, Belmont Pump. Station, WW. 32, 500; new flocculating and coagulating Torresdale Filtration Plant, WW. 2 $40,200; plans 10% completed arterial and tanks, WW. 30, $2,612,700; reha tion Queen Lane Pumping Station, W $420,000; new rapid sand filters, Torr Filtration Plant, WW. 35, $3,895,000; pump. stations, Fox Chase, WW. 21 at West Oak Lane, WW. 39, Belmont, WW. 40, $95,000; at Roxbo WW. 41, $91,000; at Oak Lane, W $90,000; plans under way installing pressure water sys., West Phila., W $2,530,000. M. McLaughlin, ch. Water reau.

N. S., Halifax—Municipality, water ply, $50,000. H. W. L. Doane, City mgr. and engr.

Ont., Grand Bend—Municipality, con WW. $50,000. G. G. Reid, 7 Edmund Toronto, engr.

Ont., Paisley—Town, Mrs. H. Elwes plans under way WW sys. About $ G. G. Reid, 7 Edmund Ave., Toronto.

Ont., Penetanguishene — Munpicip stand-by pipe and other WW imprvs. $ Water & Light Comn., Town Hall, eng

Ont., Port Perry—Town, H. J. Hutch clk., plans under way WW sys. About 000. G. G. Reid, 7 Edmund Ave., Tor engr.

Ont., Wheatley—Town, R. M. Ep clk., City Hall, plans under way WW About $25,000. G. G. Reid, 7 Edmund Toronto, engr.

Ont., Whitby—Municipality, J. R. clk., sewer extens. $50,000. James. Pr & Redfern, Ltd., Excelsior Life Bldg., onto, engrs. CD 4/14—ENR 5/4.

READY FOR BIDS

Mich., Detroit—Dpt. Water Supply, Randolph St., plans completed conn nection of Pumps 3 to 14 at WW Park, installing 36 in. rotary valve between and high service sys. $15,000. L. G. hardt, 735 Randolph St., supt.-mgr.

N. Y., Willard—Dpt. P. Wks., State Bldg., Albany, Zone 1, plans compl water supply, filtration plant, at Wi State Hospital, for Dpt. Mental Hyg MH-75, $304,000. Div. Architecture, C White, comr. CD 12/30—ENR 1/13.

SEWERS, WASTE DISPOSA

PROPOSED WORK

Conn., Danbury—Dpt. P. Wks., 174 M St., brick, steel, concrete incinerator pl $100,000.

★**Ill., East St. Louis**—City, J. I. Conn mayor, City Hall, preliminary surv made, storm water and relief sewerage $5,500,000-$4,000,000. Plans bond elec April, 1945. CD 8/7—ENR 8/24.

★**Mich., Battle Creek** — City, X. Damoose, dir. P. Serv., City Hall, s itary sewers, $536,558; storm sewers, $314,

N. Y., Amityville—Village, storm wa sewers in Merrick, Union and Morris Av $44,590. State Aid Planning Funds allott CD 4/7—ENR 4/20.

N. Y., Johnstown—City, City Hall, garb and mill waste incinerator plant. $35, State Aid Planning Funds allotted.

N. Y., Malone—Village, City Hall, garb incinerator, $35,000; sludge digestion tan $38,000. State Aid Planning Funds allott

N. Y., Manlius—Village, sanitary sewer sys. $170,000. State Aid Planning Fu allotted.

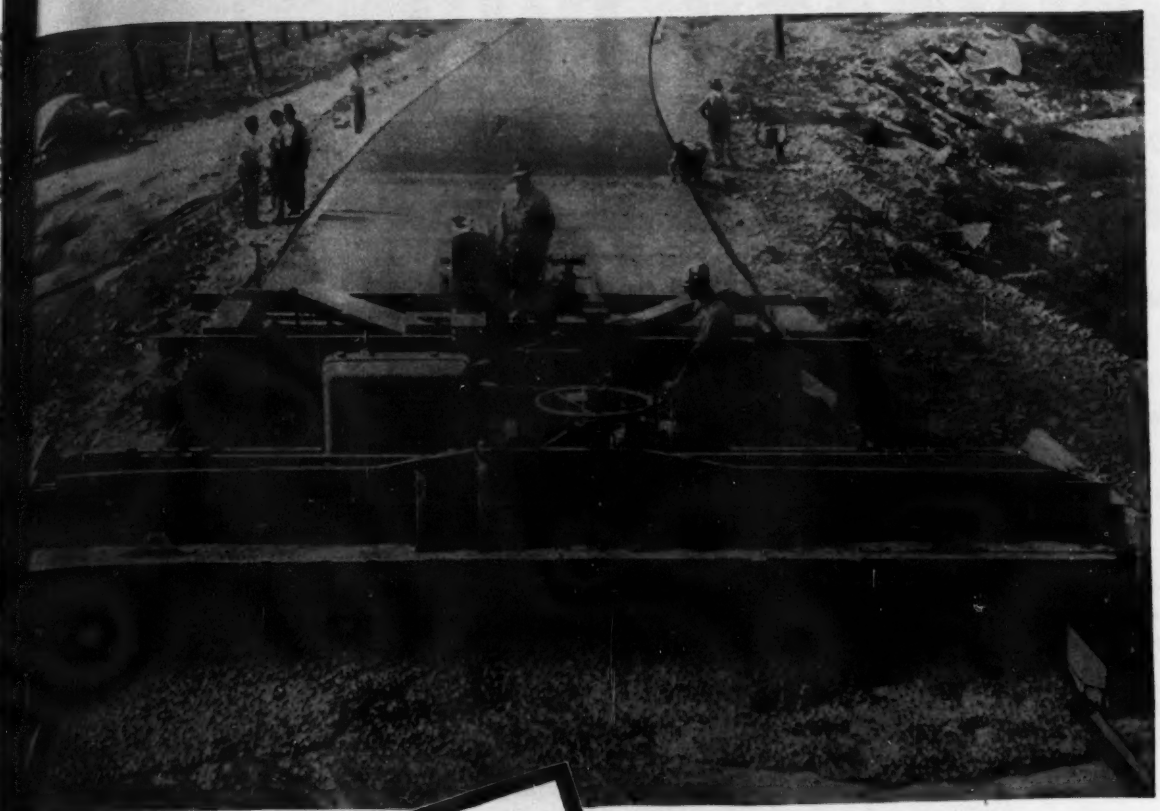
N. Y., White Plains — City, City Ha storm water drain, Mamaroneck-Bat Aves., $127,000; Longview Ave., $117, State Aid Planning Funds allotted.

★**O., Fostoria**—City, H. M. Wanzer, P. Serv., Municipal Bldg., defeated bon repairing, imprv., exten. sewerage $500,000. CD 8/30—ENR 9/21.

Ore., Springfield—City, City Hall, wa bonds, sewage disposal plant, $165,000.

Tex., Denison—City, City Hall, sanita sewerage sys. imprvs. $60,000.

Wash., Newport—City, R. E. Carpent mayor, City Hall, sewage disposal pla $50,000. Site purchased.



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Radial and thrust load absorbers, SKF's are self-aligning to compensate for shaft deflections, distortions or weave without binding. Result: long life is a certainty and maintenance costs stay down.

On the machines smashing paving records from one end of the country to the other, the bearings on the vital parts invariably are SKF's. 5689

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Here's graphic evidence of light-weight pipe performance. Top photo shows Steep Rock lake in Canada at the start of the project where more than a mile of large diameter Naylor Pipe is literally moving the lake at the rate of seven inches a day. Lower picture shows same view of lake, 90 feet shallower. This exclusive Lockseam Spiralweld Pipe is still making light work of drinking the lake.

Use Naylor Pipe for dredging, hydraulic sluicing, de-watering, ventilating, exhaust and intake and other applications of high and low pressure air and water lines. Sizes from 4" to 30" in diameter—all types of fittings, connections and fabrications.

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POSTWAR PROJECTS (Cont'd.)

Alta., Wetaskiwin—Municipality, $30,000. C. Murphy, Town Hall, supt. **B. C., Cranbrook**—Municipality, sys. exten. $40,000.

Man., Dauphin — Municipality, extens. $50,000.

Ont., Elora—Council, Reeve H. chn. Com., City Hall, sewerage sys. $35,000.

Que., Ste. Therese—Municipality, R. trauet, clk., Ste. Therese, sewer $50,000.

PLANS UNDER WAY

★ **Calif., El Centro**—City, 142 S. Sixt sewers, outfall, $400,000; storm, $1 sewer laterals, $20,000; trash and g disposal plant, $25,000. Financing no vided. E. Paul Ford, 142 S. Sixth St P. Wks. and city engr.

★ **Calif., Glendale**—City, City Hall, under way storm sewers, La Zanja let, $29,300; East Glenoaks Canyon, $1 Chevy Chase Debris Basin, $302,500; tral District, $2,842,720; South St. $87,000; Casa Verdugo, $87,800; W Ave., $132,500; Allen Ave., $163,500; crest Ave., $195,360; Royal Blvd., $14 storm channel, Sparr Blvd., $195,000; Canyon, $214,000; Niodrara Dr., $1 storm water sys., Dead Horse Canyon La Zanja, $250,000; sewage sys., Av Dr. Pumping Station, $21,500; sanitary ers, Riverside and Rohr Drs., et al, $2 incinerator, $235,000. J. C. Albers, city and street supt.

Calif., Pomona—City, City Hall, enla sewage disposal plant, $232,000. Bla Veatch, 4706 Bway., Kansas City, Mo., sult. engrs. F. C. Froehde, city engr.

Calif., San Mateo—City, City Hall, 25% completed various storm drains, $28; plans 20% completed sewage plan largement, $75,000. Financing not prov W. D. Soule, City Hall, city engr.

Colo., Colorado Springs—City, City plans 40% completed 14.56 mi. 12- to cement or clay storm sewers in va parts of city. $338,000. Financing not vided. F. O. Ray, City Hall, city engr.

Conn., Fairfield—Town, F. S. Shaw, Mill Hill Southport, incinerator off Rest Wakeman Island. $75,000. Keis & Hel 257 Bway., Troy, N. Y., consult. engrs.

★ **Conn., Greenwich**—Town, W. Johns Wks. Dpt., Town Hall, storm sewer drains, various locations. $500,000. W Wachter, 3 Putnam Court, consult. CD 11/3—ENR 11/16.

Conn., Milford—Town, Bd. Sewer Co Town Hall, sanitary sewers, Hill, S Beardsley, Pearl and George Sts. $4 V. B. Clarke, 336 Main St., Ansonia, en

Idaho, Boise—City, A. A. Walker, ma City Hall, studies under way sewage posal plant. Over $25,000. L. R. Stock Baker, Ore., consult. engr. J. F. McBi City Hall, city engr.

Ill., Blue Island—City, City Hall, p 50% completed 59,617 ft. 12- to 24-in. bined sanitary and storm water sew sys., etc. $311,000. Financing not provi A. L. Fox, City Hall, city engr.

Ill., Forest Park—City, City Hall, p 90% completed storm sewers. $4 Financing not provided. E. Hancock, Jackson Blvd., Chicago, consult. engr.

Ia., Boone—City, City Hall, plans completed storm sewerage sys. $17 Financing not provided. Geo. A. Na City Hall, city engr. CD 6/24/43—B 7/1/43.

Ia., Clinton—City Council, City Hall, st water pump. station for main trunk se $150,000. Legal obstacles to be overc and financing not provided. B. R. An son, City Hall, city engr. CD 9/29—B 10/19.

★ **Ia., Council Bluffs**—City, City Hall, st disposal plant, $750,000; intercep sewerage sys., $300,000; addnl. storm sew $250,000; open ditch drainage, $100,000. nancing not provided. J. Boyne, City E city engr.

★ **Ia., Dubuque** — City, A. A. Rhomb mgr., City Hall, plans 10% comple sewage treatment plant, $500,000. Cons Townsend & Associates, 211 West Wa Dr., Chicago 6, Ill., consult. engrs. 6/17/43—ENR 6/24/43.

Mich., Ann Arbor—City, City Hall, p liminary plans under way city wide st sewer project, incl. 2,015 lin. ft. 31- 66-in. rein.-con., 2,376 lin. ft. 24 and in. plain concrete, 4,386 lin. ft. 18 and in. concrete or vitr. pipe, $72,198. Geo. Sandenburgh, City Hall, city engr.

Mich., Bay City—City, City Hall, pl under way sewer relays. $30,865. R. J. Gillivray, City Hall, city planner.

Mich., Birmingham — City, City H exten. sewerage sys., $43,250. Financing provided. H. H. Corson, City Hall, C engr. CD 11/9.

Mich., Coldwater—City, City Hall, pl 95% completed sewerage sys. and disp plant, $230,464. Financing not provi Shoecraft, Drury & McNamee, State S ings Bank Bldg., Ann Arbor, consult. en CD 10/19—ENR 11/2.

★ **Mich., Detroit**—Dpt. Water Supply, Randolph St., plans under way st combustion and heat recovery equip. ad at sewage disposal works. $550,000. L. Lenhardt, 735 Randolph St., supt.-mgr.

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POSTWAR PROJECTS (Cont'd.)

Mich., Gladstone—City, 1100 Delta Ave., installing storm sewers in concrete paved sections of city, $119,000. Financing not provided. L. D. Goddard, Hancock, consult. engr. H. J. Henrikson, Gladstone, city engr.

Mich., Midland — City, City Hall, plans 50% completed enclosing single drain. $60,000. M. V. Hunter, City Hall, city engr.

Mich., Milan—Village, 154 E. Main St., plans under way sewerage, $89,250. Financing not provided. E. Shoecraft of Shoecraft, Drury & McNamee, State Savings Bank Bldg., Ann Arbor, consult. engr. CD 9/20—ENR 10/5.

Mich., Monroe—City, City Hall, imprv. sewerage sys. $210,700. A. J. Jennings, City Hall, city engr. CD 10/25—ENR 11/16.

Mich., Muskegon Heights—City, City Hall, plans 20% completed storm sewers, 3 year program, $291,000, G. Whelpley, City Hall, city engr.; plans 50% completed settling and digester tanks, $50,000, A. E. Hanson Engr. Co., Muskegon, consult. engrs. Financing not provided.

Mich., Niles—City, City Hall, plans completed sewage disposal plant, $100,000; intercepting sewers, $150,000. Financing not provided. Shoecraft, Drury & McNamee, State Savings Bank Bldg., Ann Arbor, consult. engrs. V. N. Taggett, City Hall, city engr. CD 10/2—ENR 10/19.

Mich., Plymouth—City, City Hall, plans 5% completed concrete sanitary sewerage sys. $70,000. Financing not provided. CD 10/25—ENR 11/16.

★**Mich., Port Huron**—City, City Hall, plans 25% completed imprv. sewerage sys., $1,516,065, financing not provided; plans 75% completed sewage disposal plant with garbage reduction, $1,005,530, land rights not cleared. Shoecraft, Drury & McNamee, State Savings Bank Bldg., Ann Arbor, consult. engrs. A. T. Carlisle, City Hall, acting city engr. CD 4/10, 11/1—ENR 4/20, 11/16.

★**Mich., Sault Ste. Marie**—City, H. A. Sherman, mgr., City Hall, plans under way storm and relief sewers, intercepting sewers and sewage disposal, $543,481. Financing not provided. Shoecraft, Drury & McNamee, State Savings Bank Bldg., Ann Arbor, consult. engrs.

Mich., Ypsilanti—City, 113 Pearl St., plans 50% completed imprv. sewerage sys., enlarging disposal plant, $125,104. Shoecraft, Drury & McNamee, State Savings Bank Bldg., Ann Arbor, consult. engrs. T. F. Older, 113 Pearl St., city engr. CD 10/25—ENR 11/16.

Mont., Billings—City, City Hall, sewage disposal plant. Over $25,000. Black & Veatch, 4706 Bway., Kansas City, Mo., consult. engrs. K. Chrysler, City Hall, city engr.

N. D., Ashley—City, City Hall, plans 10% completed sewerage imprvs. $123,000. Land rights not cleared. P. M. Barnes, Valley City, city engr.

O., Camden—Village, L. Townsley, mayor, Municipal Bldg., plans under way exten., enlarging storm sewers. $25,000. Bond issue approved.

★**O., Cincinnati**—City, W. H. Kellogg, mgr., Municipal Bldg., approved bond issue miscellaneous sewer construction, imprvs. $3,000,000. H. H. Krans, Municipal Bldg., city engr.

O., North College Hill (br. Cincinnati)—City, City Bldg., bond issue approved sewers and sewer imprvs. $140,000. J. Allen, City Bldg., city engr.

O., Xenia—City, G. D. Ackerman, mgr., Municipal Bldg., plans under way sewerage treatment plant, $90,000. R. T. Parrish, N.B. Bldg., Dayton, consult. engr.

Ore., Eugene—City, City Hall, voted special levy to finance construction sewage disposal plant. $156,000. W. Clubb, City Hall, city engr. CD 6/19—ENR 7/13.

★**Pa., Phila.**—City, J. Neeson, dir. P. Wks., City Hall, plans 80% completed Mansfield Ave. sewer, combined sys., WE.52.A, $124,000; Greenwood Ave. sanitary sewers for conversion combined to separate sys., WE. 53, $100,000; sewage collection and treatment program, Somerset low level interceptor gates and chamber, Proj. WE. 2, $186,400; Wissohickon low level interceptor exten., Proj. WE. 14, $69,800; Central Schuylkill pump. station force mains, Proj. WE. 6, $519,000; 50 St. interceptor exten., Proj. WE. 12, $78,500; Wissohickon high level interceptor exten., WE. 13, $67,500; Wakeling St. sewer, combined sys., WE. 45, $125,000; plans 75% completed addnl. high level influent conduit from Frankford grit chamber to Northeast works, Proj. WE. 16, $496,500; Central Schuylkill west side collector, WE. 8, $1,000,000; Central Schuylkill siphon, Proj. WE. 7, $355,000; sections of Sandy Run storm sewers, WE. 113, $41,000, WE. 112, $43,000, WE. 111, $42,000, WE. 110, $43,000, WE. 116, $50,000, WE. 106, $43,000, WE. 107, $42,000, WE. 108, $41,000, WE. 109, $42,000, WE. 114, $42,000, and WE. 115, 50,000; plans 70% completed Packer Ave. south branch sewer combined sys., WE. 42A, $455,000; Oak Lane sewer, separate sys., WE. 44A, $295,000; Sandy Run northeast and southwest branch sewers, separate sys., WE. 47A, $400,000; Ashburner St. sewers, sepa-

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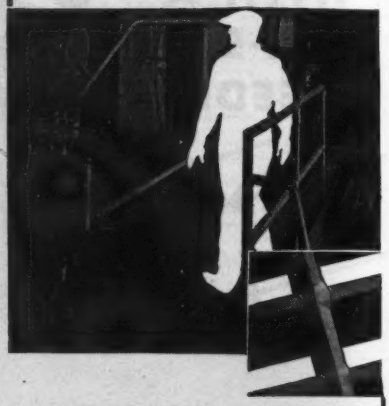

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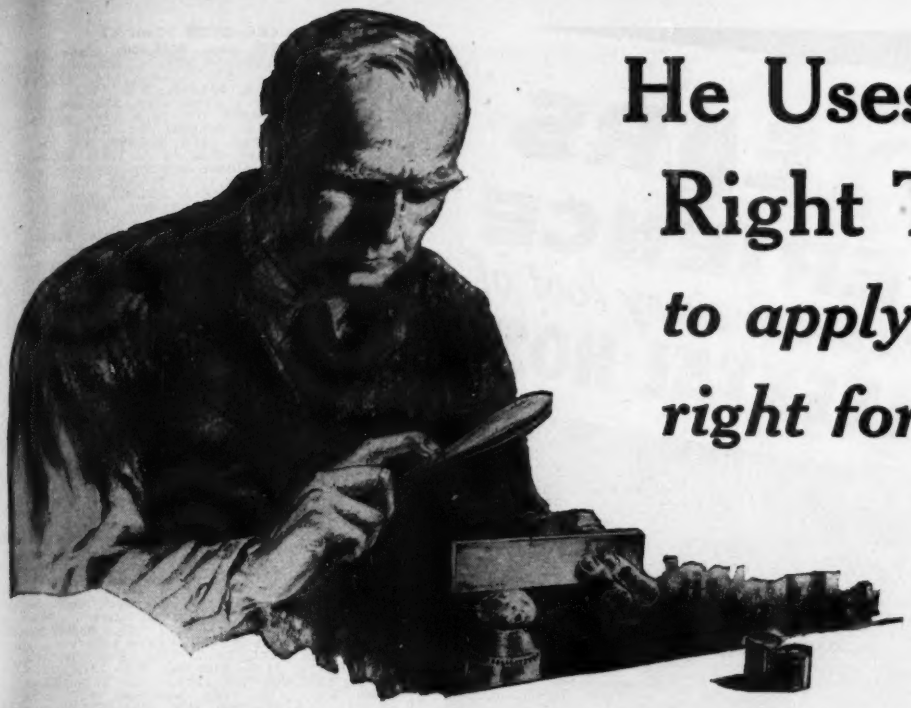

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GRADE	Velocity, feet per second, in the open 1¼" x 8"	Velocity, feet per second, confined in pipe 1¼" x 8'	MINIMUM NUMBER OF 8" CARTRIDGES PER 50 LBS. (MAXIMUM 10% MORE)								
			⅞"	1"	1⅛"	1¼"	1½"	1¾"	2"	4"	5"
90%	20000	22900	195	153	121	100	68	53	39	10	7
80%	18000	21000	195	153	121	100	68	53	39	10	7
75%	17500	21000	195	153	121	100	68	53	39	10	7
60%	16000	20000	194	149	117	97	65	50	38	9	6
50%	9000	17700	179	138	111	90	62	46	35	8	6
40%	8000	15000	179	138	111	90	62	46	35	8	6
35%	7500	10500	170	131	106	85	58	44	33	8	6
30%	7000	10500	170	131	106	85	58	44	33	8	6

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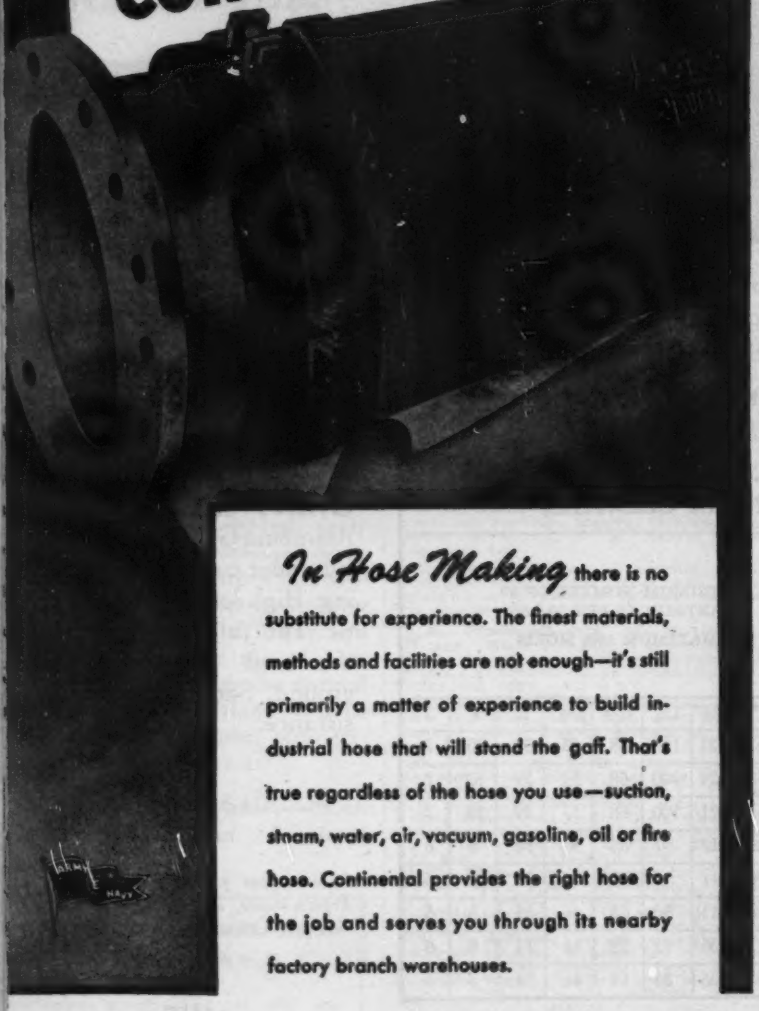

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Chicago, Ill.	Detroit, Mich.	Milwaukee, Wis.	San Francisco, Cal.
Cincinnati, Ohio	Indianapolis, Ind.	New York, N. Y.	St. Louis, Mo.

CONTINENTAL RUBBER WORKS

ERIE, PENNSYLVANIA, U. S. A.

POSTWAR PROJECTS (Cont'd.)

rate sys., WE. 40A, $715,000; plans 65% completed Lawndale sewers, separate and combined sys., WE. 183A, 184A, $35,000, WE. 181A, 182A, $35,000, WE. 179A, 180A, $35,000, WE. 187A, 188A, 189A, $355,000, WE. 169A, 170A, $350,000, WE. 167A, 168A, $35,000, WE. 171A, 172A, $35,000; WE. 185A, 186A, $35,000; WE. 173A, 174A, $35,000, WE. 175A, 176A, $35,000 and WE. 177A, 178A, $35,000; Burholme Fox Chase sewers, separate and combined sys., WE. 169A, $25,000, WE. 165A, 166A, $25,000, WE. 164A, $25,000, WE. 160A, $25,000, WE. 151A, $25,000, WE. 158A, $25,000, WE. 157A, $25,000, WE. 156A, $25,000, WE. 163A, $25,000, WE. 162A, $25,000, WE. 161A, $25,000, WE. 155A, $25,000, WE. 154A, $25,000, WE. 153A, $25,000, WE. 152A, $25,000, WE. 150A, $25,000 and WE. 149A, $25,000; 60th St. high level cut-off sewer, Proj. WE. 19, $534,500; plans 50% completed Rhawnhurst and Castor Highlands sewers, separate and combined sys., WE. 190A, 191A, $65,000 WE. 192A, 193A, $65,000, WE. 194A, 195A, $60,000, WE. 196A, 197A, $60,000, WE. 198A, 199A, $65,000, WE. 200A, 201A, $60,000, WE. 202A, 203A, $65,000, WE. 204A, 205A, $65,000, WE. 206A, 207A, $60,000, WE. 208A, 209A, $60,000, WE. 210A, $25,000, WE. 212A, $25,000 and WE. 211A, $250,000; city wide outlet sewers for home builders low cost development, WE. 346A to WE. 371A, $369,825; city wide sewers replacing temporary drains, separate and combined sys., WE. 292A to WE. 345A, $492,500; city wide sewers relieving cesspool nuisances, WE. 213A to WE. 291A, $859,944; Upper Delaware collector exten. to county line, Proj. WE. 3, $1,170,000; Central Schuylkill pump. station, Proj. WE. 5, $700,000; addnl. plant capacity at Northeast Treatment Plant, Proj. WE. 1, $2,234,000; Pennypack creek interceptor exten., Proj. WE. 17, $1,308,000; Southwest main gravity collector, Proj. WE. 15, $6,075,000; Lower West Schuylkill collector, Proj. 21, $2,239,000; Sandy Run main branch sewers, separate sys., Proj. WE. 144A, 145A, 146A, $130,000, WE. 141A, 142A, 143A, $135,000, WE. 138A, 139A, 140A, $135,000, WE. 135A, 136A, 137A, $130,000, WE. 147A, 148A, $146,000, WE. 132A, 133A, 134A, $135,000; WE. 129A, 130A, 131A, $130,000, WE. 123A, 124A, 125A, $135,000, WE. 126A, 127A, 128A, $130,000, WE. 120A, 121A, 122A, $130,000 and WE. 117A, 118A, 119A, $135,000; Pattison Ave. sewer combined sys., WE. 43A, $782,000; Penrose Ave. sewer combined sys., WE. 41A, $1,049,000; plans 55% completed city wide sewers for 6-year development, WE. 57A, $750,000; plans 50% completed lower east Schuylkill collector, Proj. WE. 22, $2,958,000; Convent Ave. pump. station, Proj. WE. 4, $348,000; Southwest Sewage Treatment Works, Proj. WE. 10, $3,855,000; Gunners Run high level interceptor, Proj. WE. 20, $1,597,000; plans 40% completed Central Schuylkill east side collector, Proj. WE. 9, $2,734,000; plans 30% completed Southeast Sewage Pump. Station and treatment works, Proj. WE. 11, $3,857,000; Lower Delaware Collector, Proj. WE. 12, $7,357,000; plans 25% completed 43 St. Pump. Station and force mains, Proj. WE. 23, $76,000. CD 12/1/43—ENR 12/16/43.

★**Tex., Houston**—City, City Hall, plans 60% completed storm sewers, $7,275,000; plans 40% completed sanitary sewers, $7,100,000. Bonds voted. Horner & Elrod, City Hall, consult. engrs. CD 10/26.

★**W. Va., Huntington**—City, City Hall, plans under way sewage disposal plant, $500,000; sewerage sys., $7,500,000. F. W. Whitney, City Hall, city engr.

B. C., Chilliwack—Municipality, sewer extens. $38,000. J. W. Turner, Chilliwack, supt. and engr.

Ont., Port Elgin—Town, J. J. Chapman, clk., City Hall, sewage and sewage disposal plant. About $120,000. G. G. Reid, 7 Edmund Ave., Toronto, engr. CD 4/3—ENR 4/20.

Ont., Sault Ste. Marie—City of Sault Ste. Marie, I. N. Hearne, acting clk., City Hall, extens., relief to sewage facilities in city and adjacent 2 townships, also disposal of sewage. About $150,000-$200,000. E. E. Smith, c/o owner, and G. G. Reid, 7 Edmund Ave., Toronto, engrs.

Ont., Whitby—Municipality, J. R. Frost, clk., WW imprvs. $35,000. James, Proctor & Redfern, Ltd., Excelsior Life Bldg., Toronto, engrs. CD 12/15—ENR 1/13.

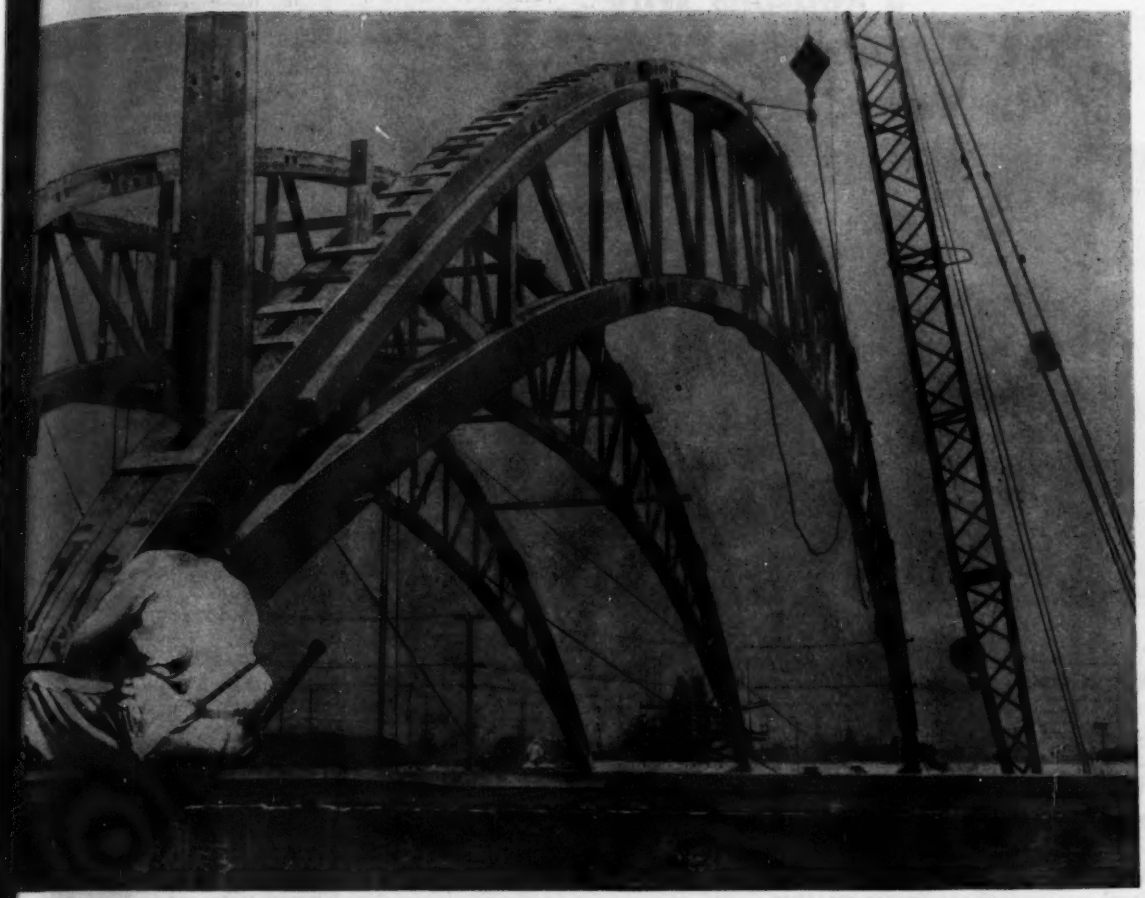
READY FOR BIDS

★**Fla., Fort Pierce**—City, City Hall, plans completed exten. sewage collection sys. and expan. sewage treatment facilities. $1,500,000. Funds available. Smith & Gillespie, Packard Bldg., Jacksonville, consult. engrs.

★**Fla., Hollywood**—City, City Hall, plans completed exten., expansion sewerage sys., sewage treatment plant. $2,000,000. Funds available. Smith & Gillespie, Packard Bldg., Jacksonville, consult. engrs. CD 9/20—ENR 10/5.

★**Fla., Panama City**—City, City Hall, plans completed exten., imprv. sewerage sys. and sewage treatment plant in old section of city. $800,000. Financing not provided. Smith & Gillespie, Packard Bldg., Jacksonville, consult. engrs.

★**Fla., St. Petersburg**—City, R. G. Ridgely, comr. P. Wks., City Hall, plans completed expan. general sewerage sys. and exten. sewage treatment plants. $4,000,000. Funds available. Smith & Gillespie, Packard Bldg., Jacksonville, consult. engrs. CD 9/2/43—ENR 9/9/43.



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POSTWAR PROJECTS (Cont'd.)

Ill., Galesburg—Galesburg Sanitary... L. W. Hunt, supt., Box 403, plans com... addnl. filter area, $84,000; digester ... holder, $31,000; addnl. final settling... $26,000.

O., Fairfield—Village, plans comple... cinerator, OT-33282, $48,000. R. T. P... N.B. Bldg., Dayton, consult. engr.

Tex., Houston—City, City Hall, plan... pleted garbage incinerator. $100,000... voted. Horner & Elrod, City Hall, ... engrs. CD 10/26.

W. Va., Huntington—City, City ... plans completed sewers in Beverly H... Forest Hills sections, $27,000; Gimle... low, etc., $23,000. Funds available. ... Whitney, City Hall, city engr.

BRIDGES

PROPOSED WORK

★**Ia., Clinton**—City, City Hall, by... across Mississippi River, $1,000,000... rights not cleared, legal obstacles ... overcome and financing not provided.

Mich., Battle Creek—City, N. G. Du... dir. Pub. Serv., City Hall, Jackso... bridge. $185,000.

N. Y., Lake Pleasant—Comrs. Ha... Co., Lake Pleasant, rebuilding 4 bridg... road imprvs., near Lake Pleasant, ... and Indian Lake, $75,000. State Aid ... ning Funds allotted.

★**Pa., Phila.**—City, City Hall, high... fixed bridge over Schuylkill Riv... Penrose Ave. $3,000,000.

PLANS UNDER WAY

Calif., Glendale—City, City Hall, plan... der way pedestrian underpass, Chevy ... Dr. at Bway., $14,800; underpasses, Ve... Glenwood, et al, $85,000. J. C. Alban... engr. and street supt.

Colo., Colorado Springs—City, City ... plans 90% completed 235 ft. steel ... with concrete floor on concrete pier... bridge, $30,000. F. O. Ray, City Hall ... engr.

Ill., Newton—Comrs. Jasper Co., Ne... proposed 1945 and 1946 imprvs., in... bridge, grading and Type B surfacing ... E, low water rd.) 2 mi. FAS 704 from ... Route 8, east, $35,000; 70 ft. bridge, ... verts, grade and Type B surfacing 1... Sec. 25-M.F.T., S. A. Route 7 from ... Co. line east, $24,000; plans prepared ... bridge over Crooked Creek Sect. 1-1-... F. T. 2 mi. southwest of Yale, $13,000... posed 1947, 1948 and 1949 imprvs., 50, ... 70 ft. bridges, grading and type B surf... (Class E) 6.5 mi. FAS 707, proposed ... cation from 1 mi. north of Bogota ... Effingham Co. line, $74,000; exten. ... placing approx. 30 small bridges, cul... various routes and locations, $18,000.

★**Ia., Council Bluffs**—City, City Hall, ... crete, steel bridge, $600,000; bridge, ... 000; concrete, asphalt paving, etc. via... over railroads, $350,000. Financing not ... vided J. Boyne, City Hall, city engr. ... 5/17—ENR 6/1.

★**Ia., Oskaloosa**—City, City Hall, plans ... completed imprv. bridges and ... $100,000. H. E. Hansal, city engr.

Kan., Marion—Marion Co., Marion, ... 15% completed 4 bridges over main stre... on secondary roads, ranging from 28-ft... 28 flat concrete slab to 85-100-85 contin... I-Beam span, $120,000. Financing not ... vided. J. F. Meisner, Marion, co. engr.

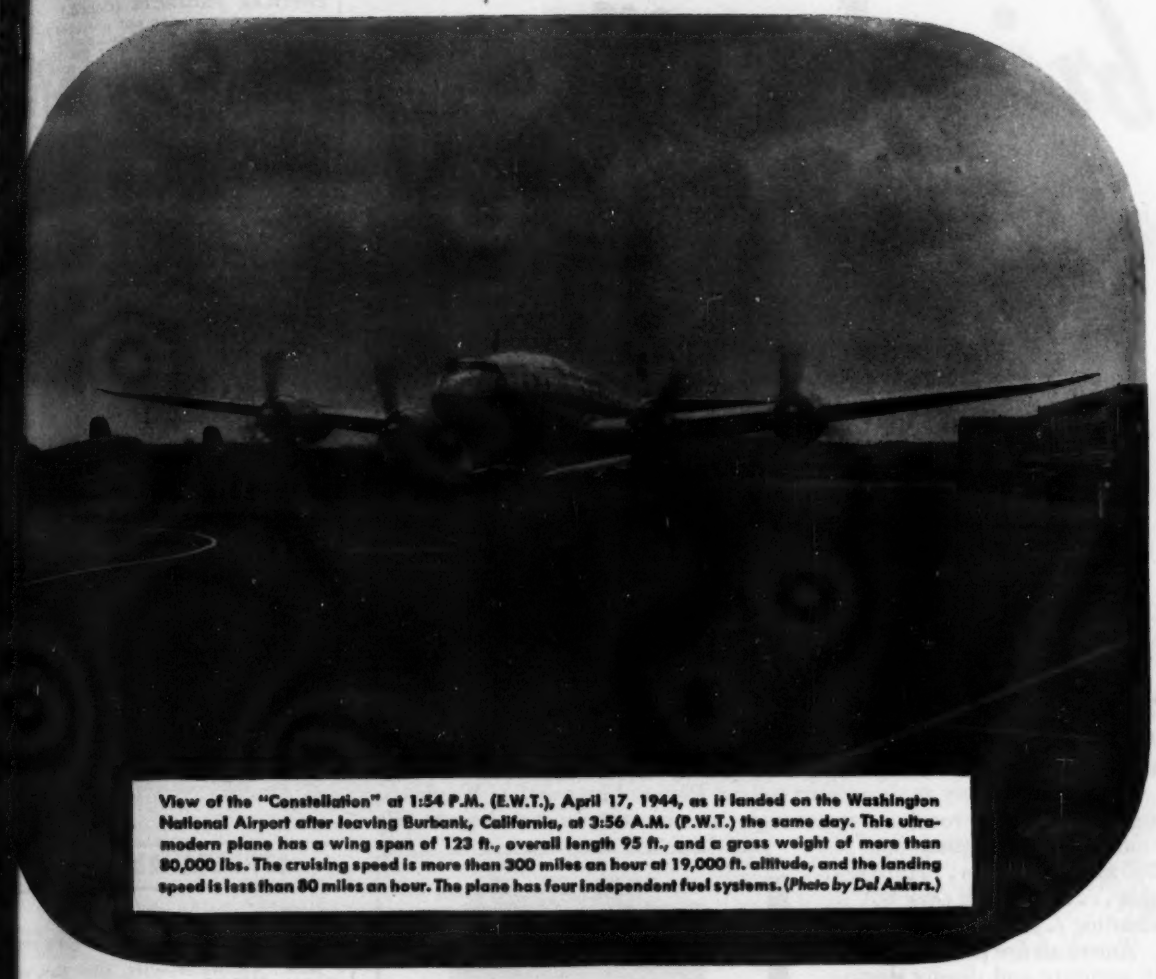
Mich., Birmingham—City, City Hall ... rein.-con. highway bridges, $28,000. Fin... ing not provided. H. H. Corson, City E... city engr. CD 11/9.

★**Minnesota and Wisconsin**—State ... Dpts., St. Paul, Minn., and Madison, ... plans under way high level steel, con... bridge over St. Croix River, near Hud... Wis., $1,000,000; bridge on Wisconsin ... $400,000.

Missouri—State Hy. Dpt., Jefferson C... plans 90% completed 9-25 rein.-con. ... spans, concrete bents to rock, steel pile ... bents, over Muddy Creek overflow Rd. f... Lamar to Joplin, $41,000; one 80 ft. and ... 50 ft. I-Beam spans, 2 concrete piers to r... 2 steel pile bents over Muddy Creek, ... from Lamar to Joplin, $34,500; one 12x15 ... rein.-con. culvert over Bee Creek Route ... Proj. FA318-A1, road from Faucett ... Buchanan Co., $18,000; two 12 ft. rein.-c... slab span over Midway Creek, road f... Lamar to Joplin, Barton Co., $3,300; th... 12 ft. rein.-con. slab spans, culvert ... over Pickerel Creek, Route 14, FA-407D... state road from Springfield to Joplin, Bar... Co., $5,200; two 15 ft. concrete slab spa... culvert type, over Grashong Branch, $10,... two 8 ft. rein.-con. slab spans, culvert ty... over Campbile Branch, road from Mow... Mills to Ethlyn, $4,000, both Lincoln Co.

N. Y., Cortland—Comrs. Cortland C... Wm. J. Dwyer, supt. hys., Court Hou... plans 50% completed 2 bridges in McGr... and Homer, $65,000. Standard Engineer... Co., 444 Bway., Albany, consult. engr.-arc... CD 6/21—ENR 6/22.

N. Y., Ithaca—City, City Hall, plans ... completed 3 span, 180 ft., continuous ... concrete bridge over Six Mile Creek, ... Giles St., $58,840; plans 80% completed ... ft. steel deck plate girder bridge over ... Creek at Lake St., $30,000, Land rights ...



View of the "Constellation" at 1:54 P.M. (E.W.T.), April 17, 1944, as it landed on the Washington National Airport after leaving Burbank, California, at 3:56 A.M. (P.W.T.) the same day. This ultra-modern plane has a wing span of 123 ft., overall length 95 ft., and a gross weight of more than 80,000 lbs. The cruising speed is more than 300 miles an hour at 19,000 ft. altitude, and the landing speed is less than 80 miles an hour. The plane has four independent fuel systems. (*Photo by Del Askers.*)

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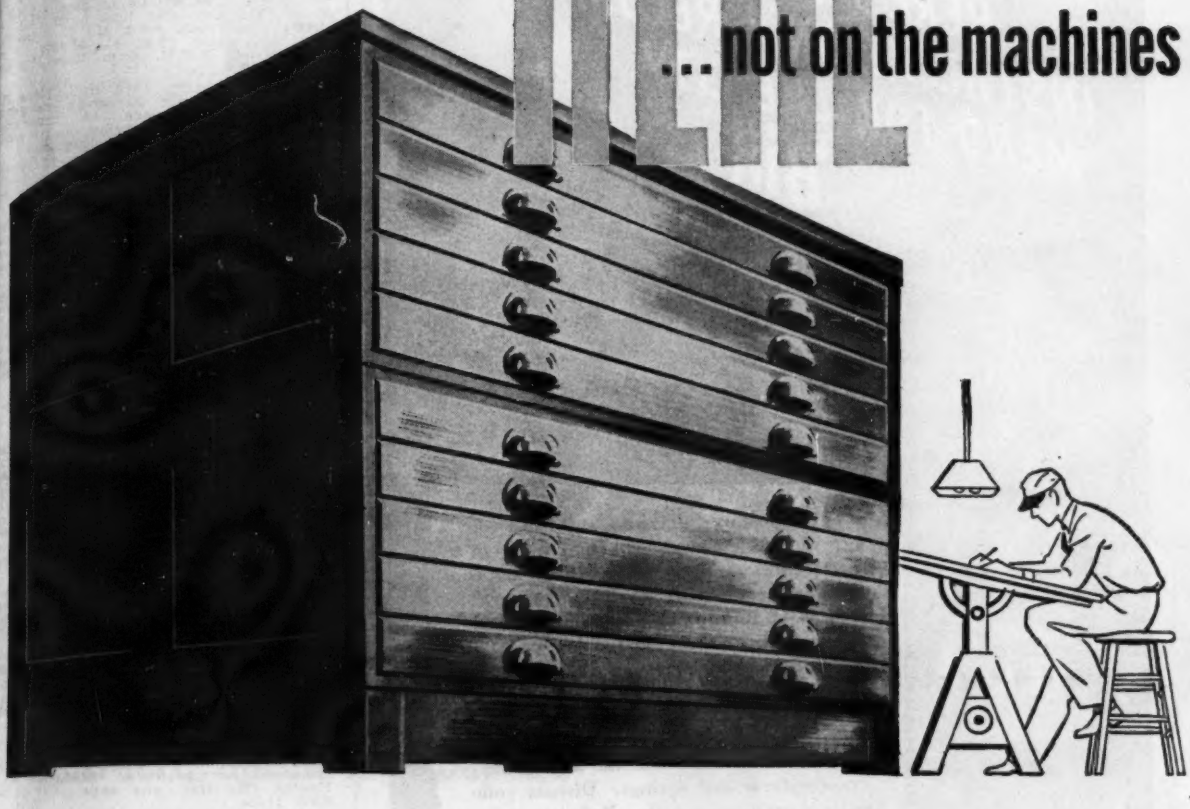

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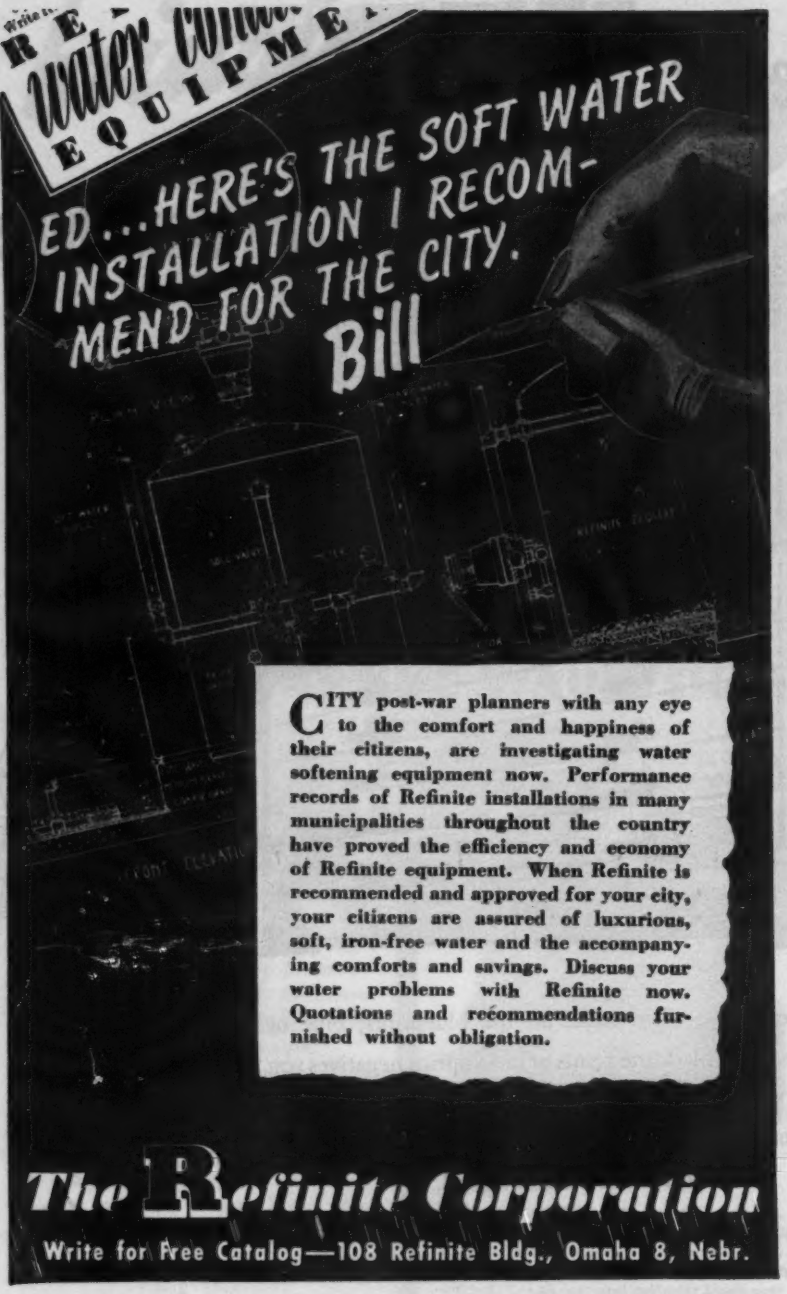

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POSTWAR PROJECTS (Cont'd.)

Ill., Newton—Comrs., Jasper Co., Newton, proposed 1945 and 1946 imprvs., made surveys grading and Type B surfacing 1 mi. Sec. 28-1, M.F.T. from S.B.T. Route 33 north, $2,000; proposed 1947, 1948, 1949 imprvs., made surveys grading and Type B surfacing 3.8 mi. Sect. 29-M.F.T., from S.A. 9 A east through Raeftown, $23,600; plans approved reconstruct 15-d sec. Type B surfacing 7.8 mi. Sec. 7-2, from Clay Co. line North S.A. 8, $4,700; 1.3 mi. Sect. 4-2 M.F.T. from Richland Co. line north S.A. 13, $800; 2 mi. Sect. 9-3-2 M.F.T., from Yale east and south (S.A. 6), $1,500; 1.5 mi. Sect. 8-4-2, M.F.T., from Rose Hill east S.A. 6, $900.

Ia., Boone—City, City Hall, plans 20% completed concrete pavement, reconstruction, resurface, surface and gravel treatment, $134,000. Financing not provided. Geo. A. Nelson, City Hall, city engr.

Ia., Council Bluffs—City, City Hall, sidewalks and curbs, $80,000; grading, graveling boulevard, $35,000. Financing not provided. J. Boyne, City Hall, city engr.

Ia., Humboldt—City, City Hall, plans blacktop surfacing 25 blocks, $25,000; plans 90% completed curb and gutter 8 blocks, $20,000. Lechner Engineering Co., Ames, engr.

★**Mich., Ann Arbor**—City, City Hall, plans 25% completed city wide street imprvs., incl. 200,745 lin. ft. curb and gutter, 54,110 sq. yd. 2 in. bituminous concrete resurfacing, 1,364 sq. yd. concrete pavement widening, $386,212; plans approx. 25 mi. sidewalk, $178,200. Geo. H. Sandenburgh, City Hall, city engr.

Mich., Bay City—City, City Hall, plans under way street imprvs. $204,500. R. M. McGillivray, City Hall, city planner.

Mich., Clawson—City, City Hall, plans 10% completed widening pavement on Main St., from north limits to south limits, $46,239. Financing not provided. H. W. Wedge, City Hall, city engr. CD 10/25—ENR 11/16.

Mich., Gladstone—City, 1100 Delta Ave., concrete paving residential area, $48,000. Financing not provided. L. D. Goddard, Hancock, consult. engr. H. J. Henrickson, Gladstone, city engr.

Mich., Ironwood—City, City Hall, plans 30% completed 12.15 mi. new black top; 128,304 lin. ft. curb; 900 ft. 32 ft. concrete; 10,768 ft. 28 ft. concrete curb and gutter; U.S. 2 widening to include 13,200 lin. ft. curb and gutters, widening present pavement from 20 to 36 ft. $305,000. Financing not provided. C. Walker, Ironwood, engr.

Mich., Manistee—City, City Hall, plans 40% completed imprvs. streets, $195,000. Williams & Works, Court House, Grand Rapids, Zone 2, consult. engrs. CD 10/25—ENR 11/16.

Mich., Midland—City, City Hall, plans 40% completed paving streets. $283,000. M. V. Hunter, City Hall, city engr. CD 10/25—ENR 11/16.

Mich., Monroe—City, City Hall, imprvs. streets, $136,200. A. J. Jennings, City Hall, city engr. CD 10/25—ENR 11/16.

Mich., Muskegon Heights—City, City Hall, plans 75% completed black top pavements, $151,000. Financing not provided. G. Whelpley, city engr.

N. Y., Cortland—Comrs. Cortland Co., Wm. J. Dwyer, Co. supt. hys., plans 50% completed road in Blodgett, Mills, Cincinnatus and Preble. $98,000. CD 6/21—ENR 6/29.

N. Y., Ithaca—City, City Hall, plans completed concrete paving 1,490 ft. Eddy St. from State to Williams St., $50,000; 4,744 ft. N. Tioga St. from State to Falls Sts., $125,000. Financing not provided. L. E. Cass, City Hall, city engr. CD 4/7—ENR 4/20.

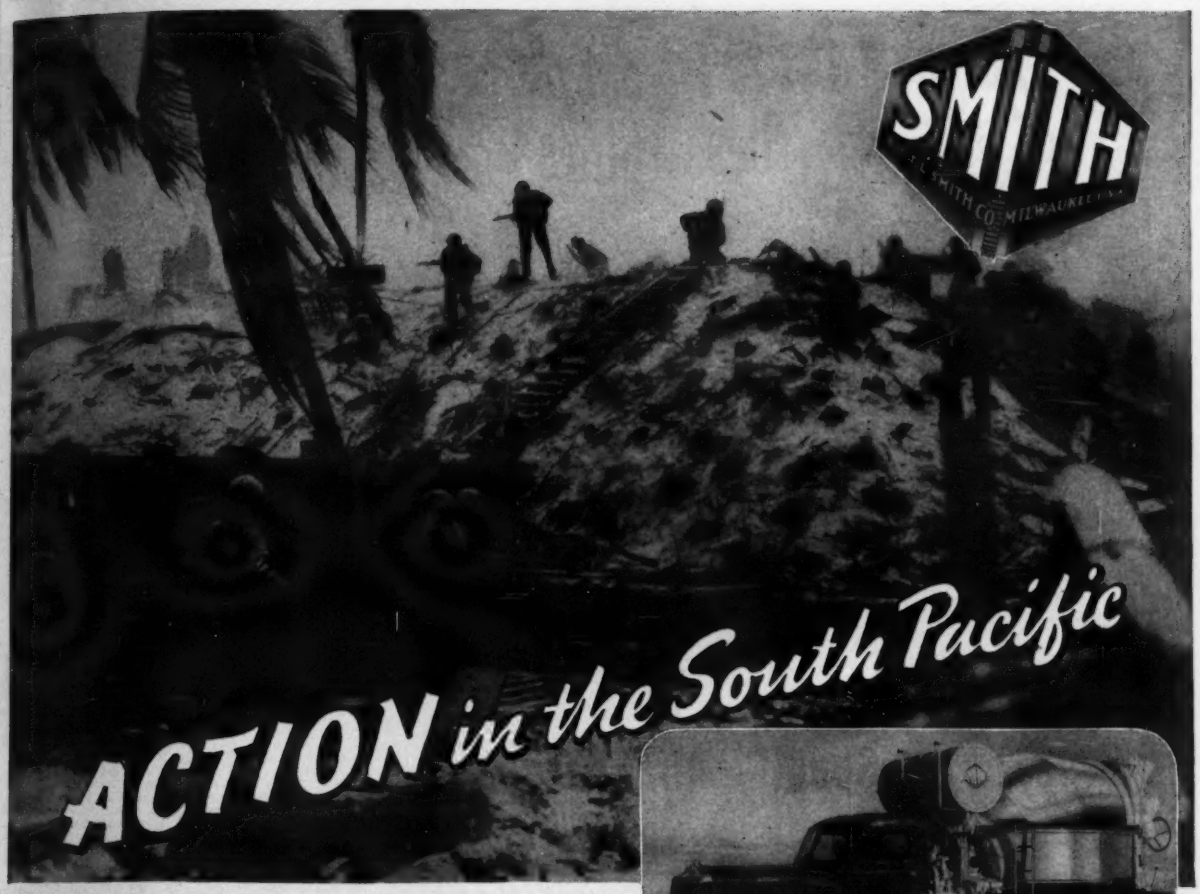
N. Y., Putnam Valley—Town, plans under way imprv. 6 mi. highway, $150,000. J. Wilbur Irish, Peekskill, consult. engr. CD 6/21—ENR 6/29.

★**O., Cincinnati**—City, W. H. Kellogg, city mgr., Municipal Bldg., approved bond issue city-wide street construction, imprvs. $6,000,000. H. H. Krans, Municipal Bldg., city engr.

★**O., Cincinnati**—Hamilton Co. Bd. Comrs., Court House, approved bond issue constructing, repairing roads. $1,000,000. H. Coates, Court House, co. engr. CD 7/19—ENR 7/27.

Ore., Nyssa—City, City Hall, plans under way 7 mi. street paving. $100,000. Spiering & Heyser, Corbett Bldg., Portland, consult. engrs.

★**S. C., Charleston**—City, City Hall, streets now needed, Alberta St. from Piedmont to Devereau St., $20,725; Alexander St. from Calhoun to Lawrens Sts., $10,285; Allway St. from Fludd to Chestnut Sts., $6,592; Ashley St. from Mt. Pleasant to Simons Sts., $29,401; Ashmead Pl. from Meeting to Eastward Sts., $4,716; Ashton St. from Norman to Chestnut Sts., $9,310; Bedons Alley from Tradd to Elliott Sts., $3,410; Bay St. from Chapel to Columbus Sts., $44,925; Brigade St. from Meeting to Railroad Sts., $16,389; Broad St. from Ashley to Chisolm Sts., $5,899; Beaufain St. from Gadsden to Barre Sts., $4,073; Chapel St. from Elizabeth to Washington Sts., $27,000; Chestnut St. from Spring to Creek Sts., $10,322; Chisolm St. from Broad to Tradd Sts.



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$9,135; Clemson St. from Mt. Pleasant to Peachtree Sts., $15,871; Clemson Dr. from Peachtree to Devereau St., $14,869; Concord St. from Calhoun to Laurens Sts., $13,720; Cooper St. from Meeting to Railroad Sts., $5,771; Court St. from Congress to Sumter Sts., $5,810; Cypress St. from King to Railroad Sts., $4,585; Darlington St. from Mt. Pleasant to Simons Sts., $31,755; Devereaux St. from Alberta to Peachtree Sts., $18,516; Dewey St. from Huger to Moultrie Sts., $7,551; Dunnemann St. from Fifth to Twelfth Sts., $32,949; Drake St., from Chapel to Amherst Sts., $17,973; E St. from Meeting to Railroad Sts., $9,055; East Bay St. from Calhoun to Chapel Sts., $22,840; Eighth St. from Dunnemann to Third Sts., $12,330; Eleventh St. from Dunnemann to Gordon Sts., $9,495; Enston St. from Mt. Pleasant to Sans Souci Sts., $8,588; Enston St. from Peachtree to Simons Sts., $13,036; Fifth St. from Dunnemann to St. Margaret Sts., $6,386; Gordon St. from Rutledge to Sixth Sts., $46,140; Grove St. from Rutledge to King Sts., $12,663; Hester St. from Mt. Pleasant to Simons Sts., $38,605; Hagood St. from Congress to Citadel Sts., $11,241; Holmes St. from Fishburne to Nunan Sts., $3,843; John St. from Meeting to Elizabeth Sts., $13,607; Jasper St. from Morris to Radcliffe Sts., $6,863; Lee St. from Meeting to Railroad Sts., $4,029; Larnes St. from Fisburne to Sumter Sts., $7,395; Laurel St. from Mt. Pleasant to Sans Souci Sts., $9,062; Lenox St. from King to Railroad Sts., $4,355; Maple St. from King to Railroad Sts., $4,804; Minority St. from Wall to East Bay Sts., $3,060; Maple St. from Rutledge to Hester Sts., $13,550; Magnolia St. from Mt. Pleasant to Peachtree Sts., $12,306; Marion St. from Smith to Jasper Sts., $5,126; Norman St. from Allway to Spring Sts., $6,098; Nassau St. from Jackson to Hill Sts., $17,284; Ninth St. from Dunnemann to Gordon Sts., $9,707; Oswego St. from Grove to Maverick Sts., $9,555; Pendleton St. from Hester to West End Sts., $9,785; Peachtree St. from King St. to Rutledge Ave., $10,270; Peachtree St. from Rutledge to West End Sts., $21,800; Poplar St. from Piedmont to Devereaux Sts., $13,995; Poplar St. from King to Railroad Sts., $5,195; Piedmont St. from Sans Souci to Maple Sts., $13,426; Poinsette St. from King to Railroad Sts., $10,988; Race St. from Ashley to Court Sts., $7,701; Reid St. from America to Bay Sts., $8,804; Romney St. from Meeting to Hanover Sts., $12,755; Romney Court from King to Westward Sts., $13,870; Riverside Dr. from Mt. Pleasant to Sans Souci Sts., $9,115; St. Margaret St. from Rutledge to Fifth Sts., $50,531; Sixth St. from Dunnemann to Third Sts., $121,120; Seventh St. from Tenth to Citadel Sts., $7,637; Sheppard St. from Meeting to Railroad Sts., $4,455; Sans Souci St. from Rutledge to West End Sts., $15,392; Sans Souci St. from King to Railroad Sts., $4,583; Simons St. from King to Ashley Sts., $17,997; Simons St. from King to Railroad Sts., $4,048; Tenth St. from Seventh to Third Sts., $15,594; Twelfth St. from Dunnemann to Gordon Sts., $9,495; Third St. from Wagener to Sixth Sts., $10,804; Wagener St. from Dunnemann to Third Sts., $10,500; Walnut St. from Lee St. to north of E St., $17,194; William St. from Meeting to Hanover Sts., $12,563; Wragg St. from Meeting to Elizabeth Sts., $6,713; streets now desirable but not absolutely needed, America St. from Jackson to Hill Sts., $19,760; Addison St. from Meeting to Russell Sts., $9,174; Adgers Wharf from East Bay to Concord Sts., $5,317; Bee St. from Wescott Court to Chinquapin Sts., $5,555; Beresford St. from King to Archdale Sts., $5,285; Chinquapin St. from Cannon to Bee Sts., $8,176; C St. east and west of E St., $11,403; Cedar St. from Meeting to Nassau Sts., $6,331; Center St. from Meeting to Hanover Sts., $12,606; Chalmers St. from Meeting to State Sts., $11,294; Cool Blow St. from Meeting to Nassau Sts., $7,807; D St. from E to Northward Sts., $5,353; Doran St. from Meeting to Nassau Sts., $7,231; Drake St. from Columbus to Cooper Sts., $10,471; Exchange St. from East Bay to Concord Sts., $4,547; F St. from North and South of I Sts., $11,064; Fludd St. from Allway to Line St., $675; Gillion St. from East Bay to Concord Sts., $1,834; Guignard St. from East Bay to Anson Sts., $4,201; Gadsden St. from Beaufain to Creek Sts., $5,390; H St. from North and South of I St., $11,064; Hanover St. from William to Center Sts., $18,083; Hanover St. from Jackson to Hill Sts., $12,961; Harris St. from Meeting to America Sts., $4,083; Hill St. from Meeting to America Sts., $38,492; Hasell St. from East Bay to Concord Sts., $10,993; I St. from King to H Sts., $3,912; Indian St. from Meeting to Railroad Sts., $8,420; Inspection St. from East Bay to Washington Sts., $3,140; Isabella St. from Meeting to Nassau Sts., $7,654; Johnson St. from Meeting to America Sts., $2,906; Johnson Court from Fisburne to Sumter Sts., $5,402; Lucas St. from Calhoun to South End Sts., $5,053; Laurens St. from Anson to East Bay Sts., $11,926; Linguard St. from State to Church Sts., $5,406; Line St. from Norman to Flood Sts., $4,300; Lily St. from Flood to Pine St., $3,034; Maiden Lane from Hasell to Pinckney Sts., $3,068; Mary St. from Meeting to America Sts., $12,471; Maple St. from Meeting to Railroad Sts., $6,979;

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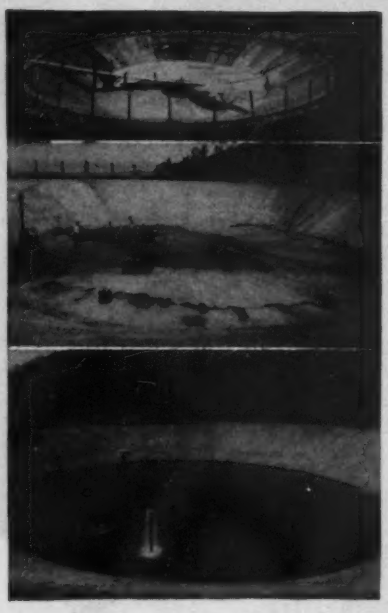

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POSTWAR PROJECTS (Cont'd.)

Nassau St., from William to Brigade St., $9,845; Nassau St. from Center to Market Court, $19,380; Philadelphia Alley from Queen to Cumberland Sts., $4,87[illegible]; Pinckney St. from Anson to East Bay St., $4,481; Price's Alley from Meeting to King Sts., $3,046; Princess St. from King to Archdale Sts., $4,589; Pine St. from Alwood to Creek Sts., $8,780; Poinsett St. from Meeting to Railroad Sts., $9,329; Riker St. from Meeting to Railroad Sts., $7,[illegible]; Rafer's Alley from Market to Guignard Sts., $2,571; Senate St. from Huger to Congress Sts., $3,851; Strawberry St. from Rutledge to East End Sts., $7,323; Sutherland Court from Huger to Moultrie Sts., $4,[illegible]; Secession St. from Exchange to East Bay Sts., $2,597; Sheppard St. from King to Railroad Sts., $5,505; Stewart St. from Meeting to America Sts., $24,476; Vernon St. from East Bay to Washington Sts., $3,200; Washington St. from Chapel to Laurens Sts., $31,850; Wescott Court from Spring to Bee Sts., $4,788; streets to be needed eventually, Bogard St. from President to Norman Sts., $342; Brigade St. from Railroad to America Sts., $9,741; Calhoun St. from Hospital to River Sts., $21,700; Charlotte St. from Washington to Concord Sts., $13,761; Clifford Alley from King to Archdale Sts., $2,876; Concord St. from Calhoun to Charlotte Sts., $11,[illegible]; Doran St. from Nassau to Railroad Sts., $8,146; Fishburne St. from President to West End Sts., $16,626; Grove St. from King to Russell Sts., $12,022; Hampstead Sq. from Columbus to America Sts., $5,[illegible]; Hughes Pl. from Meeting to Nassau Sts., $4,138; Isabella St. from Nassau to Railroad Sts., $10,461; Islington Court from Cannon to Southward Sts., $3,860; Kennedy Court from Ashley to Eastward Sts., $3,[illegible]; Kirkland Lane from Wentworth to Beaufain Sts., $2,553; Lightwood Alley from Atlantic to Northward Sts., $1,726; Lodge Alley from State to East Bay Sts., $2,510; Longitude Lane from East Bay to Church Sts., $4,[illegible]; Meeting St. from Stewart to Butler Sts., $3,025; Oeland Pl. from Meeting to Nassau Sts., $4,218; Pinckney St. from East Bay to Concord Sts., $5,620; President St. from Doughty to Southward Sts., $6,393; Pritchard St. from East Bay to Concord Sts., $7,441; Prioleau St. from Vendue Range to Exchange Sts., $12,921; Rose Lane from Spring to Line Sts., $7,426; Rodgers Alley from King to St. Philip Sts., $2,300; Rosemount St. from north and south of Bogard St., $10,461; Spring St. from Chestnut to First Sts., $3,260; Unity Alley from East Bay to Church Sts., $2,079; William St. from Hanover to Railroad Sts., $3,767; streets fully improved but will need repairs, Ashley St. from Tradd St. to Boulevard Sts., $5,674; Calhoun St. from Meeting to Concord Sts., $74,925; Cannon St. from Ashley to President Sts., $1,485; Church St. from Water to South Battery Sts., $6,375; Coming St. from Spring to Beaufain Sts., $117,700; Cleveland St. from King to Hampton Park Sts., $18,616; Council St. from Tradd to Boulevard Sts., $14,742; East Battery St. from South Battery to East Bay Sts., $5,288; East Bay St. from Broad to Calhoun Sts., $92,370; George St. from St. Philip to Anson Sts., $22,595; Gibbes St. from Lenwood to Tradd Sts., $26,185; Judith St. from Elizabeth to America Sts., $400; King St. from Calhoun to Broad Sts., $76,726; King St. from Moultrie to Maverick Sts., $383; Laurens St. from East Bay to Wharf Sts., $7,878; Lenwood St. from Tradd to Boulevard Sts., $17,808; Limehouse St. from Tradd to Gibbes Sts., $5,145; Limehouse St. from Gibbes to Boulevard Sts., $4,214; Liberty St. from King to St. Philip Sts., $3,710; Lowndes St. from Lenwood to Gibbes Sts., $5,690; Murray Blvd. from King to Tradd Sts., $57,925; Rutledge St. from Spring to Cleveland Sts., $62,429; Rutledge St. from Tradd to Boulevard Sts., $14,478; Smith St. from Calhoun to Vanderhorst Sts., $11,652; South Battery St. from Tradd to East Battery Sts., $75,128; St. Philip St. from Calhoun to Beaufain Sts., $16,712; St. Philip St. from Vanderhorst to Line Sts., $27,914; Water St. from Meeting to East Battery Sts., $6,675; Wentworth St. from Rutledge to Ashley Sts., $3,690; streets in marsh, America St. from Hill St. to City Boundary, $131,110; Bay St. from Cooper to Hill Sts., $112,225; Bee St. from Chinquapin to First Sts., $57,934; Bennett St. from Gadsden to Lucas Sts., $7,974; Beaufain St. from Barre to River Sts., $32,980; Barre St. from Bull to Beaufain Sts., $68,490; Broad St. from Chisolm to River Sts., $57,475; Bull St. from Gadsden to Barre Sts., $12,695; Cedar St. from Nassau to America Sts., $34,580; Center St. from Hanover to Drake Sts., $45,790; Chinquapin St. from Bee to Doughty Sts., $29,216; Congress St. from Hagood to River Sts., $126,025; Cool Blow St. from Nassau to Drake Sts., $63,261; Doughty St. from President to First Sts., $93,723; Drake St. from Cooper to Romney Sts., $168,950; Eleventh St. from Gordon to Third Sts., $12,317; First St. from Spring to Calhoun Sts., $93,686; Fourth St. from Spring to Calhoun Sts., $101,986; Hanover St. from Hill to Center Sts., $71,000; Harris St. from America to Bay Sts., $39,750; Hester St. from Simons to Gordon Sts., $26,370; Hill St. from America to Bay Sts., $42,015; Johnson St. from America to Bay Sts., $42,015; Jackson St. from America to Bay Sts., $34,290; Line St. from Fludd to

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Chapman's standard line of Sluice Gates contains such a wide range of types and sizes that the cost and delay of specially built equipment can be eliminated in average cases. Further savings can be effected in installation, because parts are interchangeable and stems and couplings do not have to be match-marked.

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Indian Orchard, Massachusetts

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Of course Dixie Cups won't stop colds once started. But they can help prevent their being passed along to others.

That fact becomes doubly important on contract work where help shortage may prove serious. Use of Dixie or Vortex Cups helps prevent the spread of contagious illnesses that cause sick absenteeism.

Valuable time is saved by bringing water to the worker with the Dixie Portable Water Carrier, instead of having him leave his job to get a drink. Lost minutes quickly multiply into lost hours where no systematic watering plan is adopted.

Workers—particularly American workers—appreciate the cleanliness of individual paper drinking cups... and the thoughtfulness of a management which provides it. ☆

Dixie and Vortex Cups are made at Easton, Pa., Chicago, Ill., Darlington, S.C., Toronto, Canada.

Write for descriptive folder giving complete information on this portable water service, including tanks, dispensers and cups.

DIXIE CUPS

DRINKING CUPS AND FOOD CONTAINERS

POSTWAR PROJECTS (Cont'd.)

River Sts., **$106,525**; Moultrie St. from Re... sell to Drake Sts., **$171,450**; Montagu... from Barre to River Sts., **$60,025**; Nas... St. from Hill to New Market Creek St... **$23,931**; Nassau St. from Center to Willia... Sts., **$43,450**; Piedmont St. from Maple... Third Sts., **$39,988**; Romney St. from Ha... over to America Sts., **$27,535**; Second S... from Spring to Calhoun Sts., **$85,7**... Simons St. from Ashley to Twelfth St... **$11,838**; Stewart St. from America to Be... Sts., **$39,390**; Tenth St. from Third to A... berta Sts., **$25,413**; Third St. from Wagen... to Twelfth Sts., **$172,825**; Third St. fro... Spring to Calhoun Sts., **$97,806**; Twelfth S... from Gordon to Third Sts., **$11,580**; Wes... worth St. from Gadsden to River St... **$68,678**. B. M. Thomson, City Hall, c... engr. CD 8/11—ENR 9/7.

★**Texas**—State Hy. Dpt., Austin, pla... under way 42.7 mi. super-highway... and 36 ft. wide, between Dallas and Fo... Worth, **$45,500,000**, not incl. right-of-wa... Parsons, Brinckerhoff, Hogan & Macdonal... 142 Maiden Lane, New York, N. Y., consul... engrs. CD 1/31—ENR 2/10.

★**Tex., Dallas**—City, plans under way... mi. section Memorial Parkway in G... Cliff area. **$800,000**. Koch & Fowler, Gra... National Life Bldg., consult. engrs.

★**Tex., Galveston**—City, City Hall, lon... range street paving program, 75 m... shell streets with concrete, gravel a... asphalt. **$500,000** bond issue planned. C. ... Washington, Court House, Galveston, c... engr. consultant.

★**Tex., Houston**—City, City Hall, pla... 68% completed permanent pavi... **$5,000,000**; plans 70% completed bitumino... paving, **$000,000**. Bonds voted. Horner ... Elrod, c/o City Hall, consult. engrs. C... 10/26.

Tex., Houston—City, City Hall, plans [6... completed street opening, widening, gra... ing, etc. **$150,000** bonds voted. Horner ... Elrod, City Hall, consult. engrs. J. Fugat... City Hall, engr.

★**Tex., San Antonio**—City, City Hall, pla... 30% completed street widening. **$500,0**... M. L. Diver, 1504 Main Ave., consult engr... T. Coghill, City Hall, city engr. C... 4/30/43—ENR 5/6/43.

Wis., Racine—Racine Co., Racine, impr... STH 42 and county trunk hys. **$451,0**... E. R. Fischer, engr.

READY FOR BIDS

Ill., Blue Island—City, City Hall, plan... completed concrete paving, curbing arter... streets. **$62,000**. A. L. Fox, City Hall, ci... engr.

W. Va., Huntington—City, City Hall, plan... completed imprv. Staunton St., **$12,000**; Ed... son Court, **$15,600**; 2nd Ave., **$16,000**; re... surfacing streets, **$200,000**. Funds available... F. S. Whitney, City Hall, city engr.

EARTHWORK, WATERWAYS

PROPOSED WORK

N. Y., Mamaroneck—Village, widening... Mamaroneck River Bed. **$55,000**. State Aid... Planning Funds allotted.

N. Y., Yonkers—City, City Hall, bulkhead... for Greystone Waterfront imprv., **$200,000**... State Aid Planning Funds allotted.

PLANS UNDER WAY

Ia., Council Bluffs—City, City Hall, levees... protecting against river. **$150,000**. Financing... not provided. J. Boyne, City Hall, city engr.

La., Alexandria—City, City Hall, plans... 10% completed drainage project carrying... water into Chatlin Lake Canal and Bayou... Rapides. **$150,000**. Pan-American Engi... neers, Alexandria, consult. engrs.

O., Delaware—City, P. J. Foley, mayor, ... Municipal Bldg., plans under way impr... Olentangy River through city by construct... ing dam and landscaping. **$35,000**. Bond... issue approved. C. Riddle, Municipal Bldg., ... dir. P. Serv. CD 11/2—ENR 11/16.

O., Portsmouth—City, J. F. Parkinson, ... mgr., Municipal Bldg., approved bond issue... flood wall exten., on Ohio River. **$110,000**... C. Zeune, Municipal Bldg., acting city engr.

★**Tex., Corpus Christi**—City, A. C. Mc... Caughan, mayor, City Hall, voted bonds... Bay Front protection (high tide or storm)... seawall. **$750,000**. Jas. V. Curnutte, Nueces... Co. engr., consult. engr. CD 11/22.

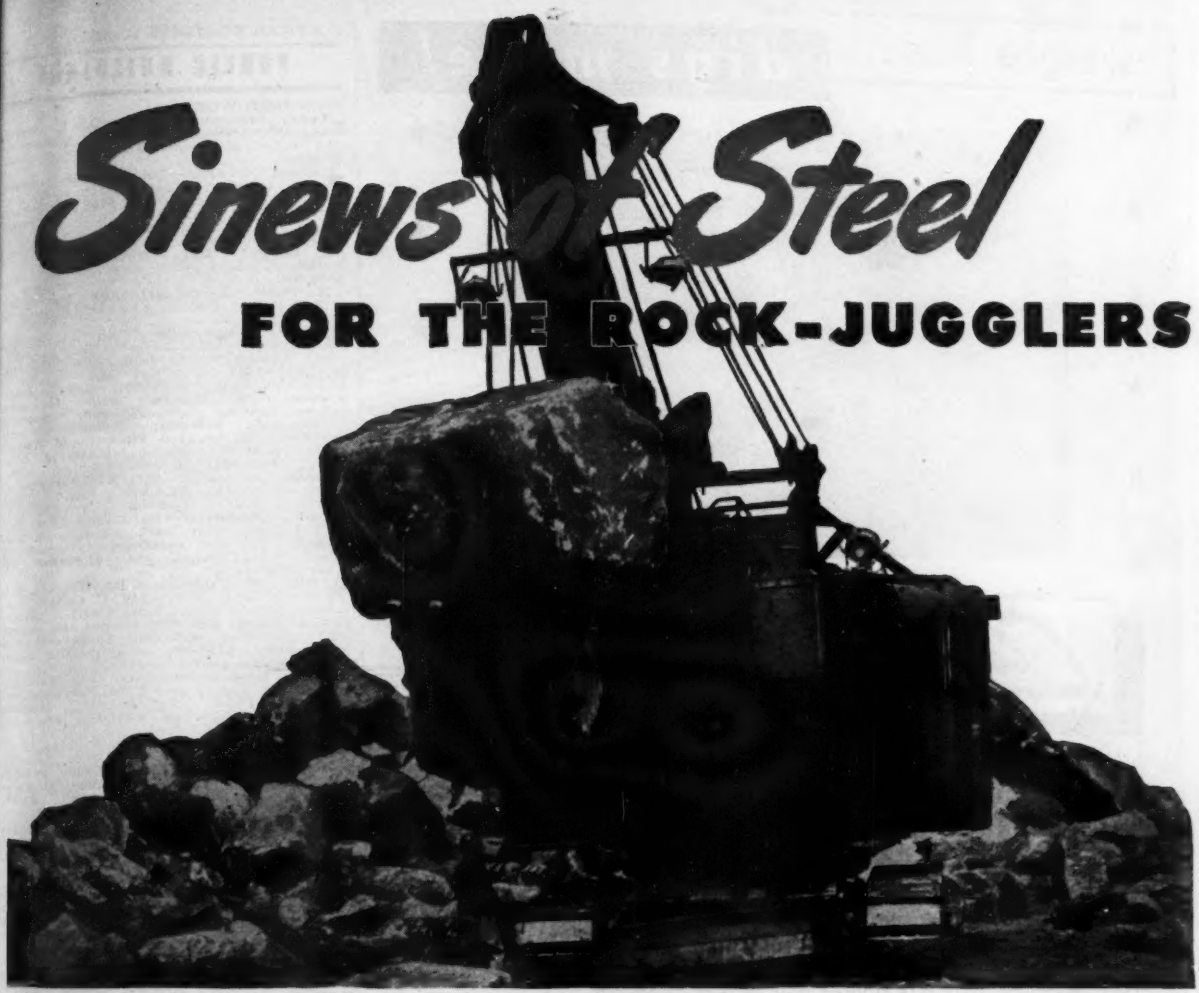
★**Tex., Houston**—Harris County Navigation... Dist., Court House, plans 10% completed... and bond election Dec. 19, widening and... straightening Morgans Point cruising area,... **$250,000**; miscellaneous imprvs. to Naviga... tion facilities in Dist., **$1,250,000**. Bonds... Nov. 7 defeated. CD 11/2—ENR 11/2.

†**Tex., Raymondville**—U. S. Eng., 25 St... and Avenue F, Galveston, plans 25% com... pleted 20 mi. 6 ft. deep channel between... Raymondville and Louisiana-Texas Intra... coastal Waterway; plans dredging channel... to 12 ft. depth for distance 20 mi. **$100,000**.

B. C., Westview—Dominion Govt., Ottawa, ... Ont., permanent rock breakwater. **$250,000**... Dpt. P. Wks., Ottawa, Ont., engr.

Sinews of Steel

FOR THE ROCK-JUGGLERS



The stone you see poised on the dipper weighs more than two tons per cubic yard. Yet the powerful shovel seems to handle it like a pebble.

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You can get increased yardage by using a larger bucket than that for which your machine was designed without exceeding the allowable loaded weight. This also applies to long boom operations. *But* you must have HENDRIX Lightweight Buckets! They're lighter . . . we've taken the load out of the bucket itself, to enable you to put bigger loads inside. In wet digging, you get an extra bonus pay load every trip by leaving the water in the pit. HENDRIX Lightweights give you strength, toughness, durability, plus many inbuilt features designed to increase your "digability."

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- All Welded construction . . . for greater strength and durability.
- Gets full load pay material every trip . . . even in wet digging.
- 3 types—light, medium and heavy duty—¾ to 20 cu. yds.

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HENDRIX Lightweight DRAGLINE BUCKETS

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PUBLIC BUILDINGS

PROPOSED WORK

Colo., Colorado Springs—D. F. Santry, secy., School Dist. 11, 2 schools, administration bldg., storeroom and shop, stadium. $350,000.

Conn., Windsor—Town, L. B. Granger, first selectman, Town Hall, brick, steel Junior-Senior High School, $700,000; 2 story, bsmnt., brick, steel John N. Niles School, Poquonock Sect., $160,000.

Ind., Indianapolis — Indianapolis School Bd., Delaware and Walnut Sts., replacing Harrison school with new modern bldg. $300,000.

Maryland—Comrs. Baltimore Co., Towson, 4 fire engine houses, various locations in county, $200,000.

Minn., Minneapolis—State, Bd. Regents University of Minnesota, W. C. Coffey, pres., Administration Bldg., Main Campus, 10 year bldg. program, incl. College of Education Bldg., $950,000; chemical engineering bldg., $500,000; boiler for main campus heating plant, $225,000; completing physics bldg., $300,000; completing connecting structures between Vincent and Murphy Halls, $350,000; main engineering bldg. addn., $450,000; pharmacy bldg. addn., $210,000; law school addn., $150,000; zoology bldg. completion, $150,000. Financing not provided. CD 4/14/43—ENR 4/22/43.

Minn., Rochester—Bd. Educ., E. W. Cutshall, clk., City Hall, voted bonds, purchasing sites and constructing, remodeling school bldgs., equip., etc. $1,800,000. CD 9/28—ENR 10/5.

Minn., St. Paul—State Bd. Regents, University of Minnesota, W. C. Coffey, pres. Administration Bldg., Main Campus, Minneapolis, library, $300,000; animal and poultry husbandry bldg., $350,000; home economics bldg. addn., $250,000, at University Farm. Financing not provided.

N. Y., Binghamton—City, City Hall, fire station for Engine No. 3, $42,000; construction, repairs at city hospital, $101,000; Calvin Coolidge School, $300,000. State Aid Planning Funds allotted.

N. Y., Binghamton—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, disturbed patients' bldg., MH-15, $1,200,000; medical-surgical bldg., MH-14, $1,850,000, at Binghamton State Hospital, for Dpt. Mental Hygiene, State Office Bldg., Albany, Zone 1.

N. Y., Buffalo—Dpt. P. Wks., State Office Bldg., Albany Zone 1, heating plant at Buffalo State Hospital, MH-128, for Dpt. Mental Hygiene, State Office Bldg., Albany, Zone 1. $550,000.

N. Y., Dewittville — Bd. Supervs. Chautauqua Co. C. B. Goodrich, clk., Court House, 2 or 3 story, bsmnt., brick, steel, concrete hospital, at Chautauqua County Home. $150,000.

N. Y., Helmuth—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, medical-surgical bldg., MH-130, at Gowanda State Hospital, for Dpt. Mental Hygiene, State Office Bldg., Albany, Zone 1, $875,000.

N. Y., Kingston—Comrs. Ulster Co., Kingston, office bldg., $250,000; court house alterations, $50,000; reconstructing men's bldg. at County Home, $75,000. State Aid Planning Funds allotted.

N. Y., Marcy—State Dpt. P. Wks., Albany, Zone 1, children's group bldgs., MH-86, $350,000; 2 dining rooms and kitchen facilities, for Bldg. F, MH-87, $100,000, at Marcy State Hospital, for Dpt. Mental Hygiene, State Office Bldg., Albany, Zone 1.

N. Y., Middletown—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, disturbed bldg., for 640 male and female patients, MH-131, $1,660,000; infirmary addn., providing 200 beds, incl. addnl. kitchen facilities at Ashley Hall, MH-132, $460,000; power plant, incl. conversion to A.C., MH-193, $900,000, at Middletown State Hospital, for Dpt. Mental Hygiene, State Office Bldg., Albany, Zone 1.

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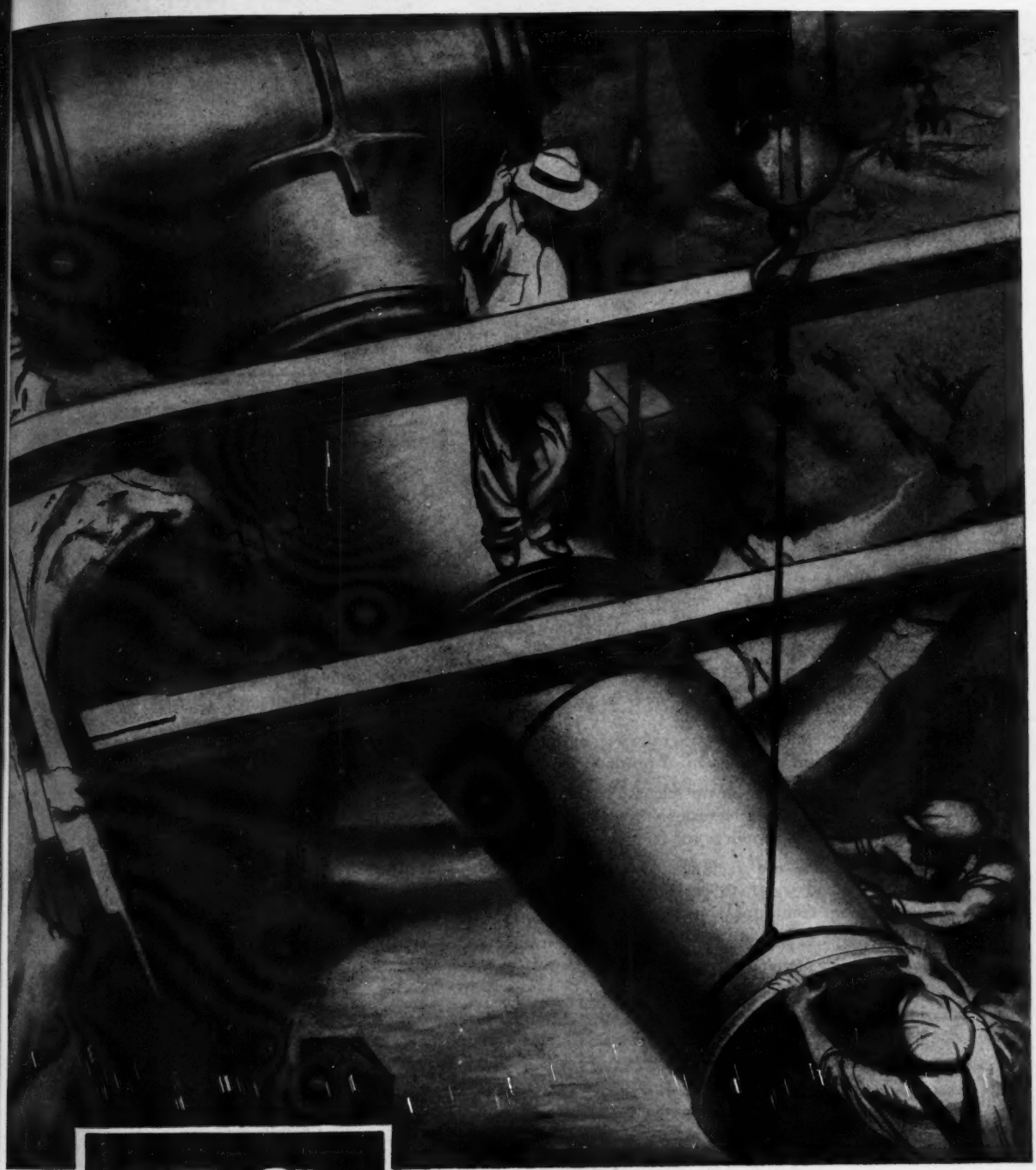

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POSTWAR PROJECTS (Cont'd.)

★**N. Y., Newark**—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, infirmary for 300 boys, MH-133, $750,000; infirmary for 350 girls, MH-134, $857,000; replacing boilers, MH-135, $180,000, at Newark State School, for Dpt. Mental Hygiene, State Office Bldg., Albany, Zone 1.

N. Y., Niagara—City, City Hall, school, $274,000; Trott Vocational School addn., $100,000. State Aid Planning Funds allotted.

★**N. Y., Poughkeepsie**—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, medical-surgical bldg., MH-37, $2,400,000; accommodations for 350 addnl. tuberculer patients, incl. demolition Bldgs. 115, 116, 118, 129, 130 and 132, MH-39, $925,000; addnl. power plant equip., MH-40, $245,000, all at Hudson River State Hospital, for Dpt. Mental Hygiene, State Office Bldg., Albany, Zone 1.

★**N. Y., Rochester**—Dpt. P. Welfare, State Office Bldg., Albany, Zone 1, medical-surgical bldg., MH-88, $2,615,000; addn. to Orleans Bldg. providing operating room, X-Ray, dental office, physiotherapy and kitchen, dining room facilities for 900 T.B. patients, MH-90, $510,000; power plant addn., equip., service connections, and ground imprvs., MH-92, $465,000, at Rochester State Hospital, for Dpt. Mental Hygiene, State Office Bldg., Albany, Zone 1.

★**N. Y., Rome**—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, medical-surgical bldg., MH-93, $870,000; central kitchen and dining room bldg., MH-94, $1,250,000; isolation bldg. for 160 boys, MH-95, $264,000; storehouse and cold storage bldg., MH-97, $465,000; addnl. power plant equip., MH-100, $340,000, at Rome State School, for Dpt. Mental Hygiene, State Office Bldg., Albany, Zone 1.

★**N. Y., Sonyea**—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, power plant and service connections, MH-26, $610,000; male infirmary bldg., MH-28, $500,000, at Craig Colony, for Dpt. Mental Hygiene, State Office Bldg., Albany, Zone 1.

★**N. Y., Syracuse**—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, medical-surgical bldg., MH-136, $1,918,000; storehouse, cold storage and bakery bldg., MH-137, $225,000, at Syracuse State School, for Dpt. Mental Hygiene, State Office Bldg., Albany, Zone 1.

★**N. Y., Thiells**—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, 4 infirmary bldgs. (2 for male and 2 for female patients), MH-81A, B, at Letchworth Village, for Dpt. Mental Hygiene, State Office Bldg., Albany, Zone 1. $964,200.

★**N. Y., Utica**—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, medical-surgical bldg., MH-122, $1,850,000; addnl. power plant equip., MH-199, $665,000, at Utica State Hospital, for Dpt. Mental Hygiene, State Office Bldg., Albany, Zone 1.

★**N. Y., Wassaic**—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, male infirmary, MH-107, $530,000; female infirmary, MH-108, $530,000; bldg. for 470 male and female TB patients, MH-111, $1,175,000; addnl. power plant equip., MH-113, $330,000; water supply sys. addn., MH-200, $50,000, at Wassaic State School, for Dpt. Mental Hygiene, State Office Bldg., Albany, Zone 1. CD 1/7—ENR 1/27.

N. Y., White Plains—City, City Hall, city hall addn. $180,000. State Aid Planning funds allotted. CD 11/24/43—ENR 12/2/43.

★**N. Y., Willard**—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, medical-surgical bldg., MH-138, at Willard State Hospital, for Dpt. Mental Hygiene, State Office Bldg., Albany, Zone 1, $2,100,000.

★**N. Y., Wingdale**—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, addnl. power plant facilities, MH-30, $375,000; 2 bldgs. for disturbed patients, MH-33, $1,800,000, at Harlem Valley State Hospital, for Dpt. Mental Hygiene, State Office Bldg., Albany, Zone 1.

N. C., Concord—Stonewall Jackson Training & Industrial School, S. G. Hawfield, supt., addnl. bldgs., silo, chapel, superintendent's home and shops. Over $325,000.

O., Fostoria—City, Municipality Bldg., H. M. Wanzer, dir. P. Serv., defeated bonds, war memorial city bldg. $180,000. CD 9/15—ENR 10/5.

O., Mount Washington—Anderson Twp. Rural School Dist., W. M. Judd, pres., Mount Washington, approved bond issue, school. $350,000.

O., Westerville—Sharon Twp. Rural School Dist., N. E. Neutzling, pres., Westerville, approved bond issue, school. $198,000.

★**Ore., Portland**—City, E. Riley, City Hall, voted special levy, jail, $684,000. CD 4/10—ENR 4/20.

R. I., Coventry—Town, H. F. King, supt. Schools, brick, steel industrial arts school, incl. gymnasium and athletic field, $200,000.

Tex., Denison—City, City Hall, municipal bldg. $150,000.

★**Tex., Odessa**—Ector County Independent School Dist., G. L. Johnson, secy., school bldg. program. $500,000 bond election planned.

★**Wash., Bellingham**—Whatcom Co., O. Ivarson, treas., Court House, approved bond issue new court house. $800,000. CD 9/29/43—ENR 9/30/43.

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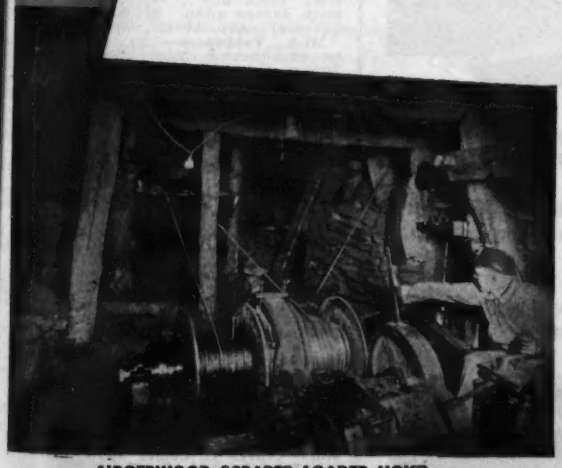

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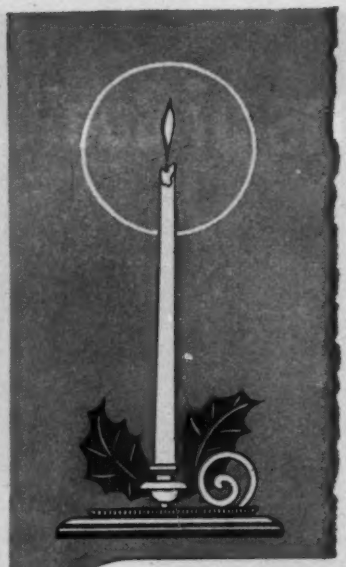

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POSTWAR PROJECTS (Cont'd.)

★**Wash., Olympia**—School Dist. 321, special levy, 10-year school bldg. program, $750,000. CD 10/25—ENR 11/1.

★**Wash., Seattle**—Shoreline School Dist., Oak Lake School, 103 St. and Aurora Ave., 2 Junior and 1 Senior High Schools, $4,000,000.

Wis., Appleton—Outagamie Co., Appleton asylum addn. $200,000.

Ont., Preston—Bd. Educ., Preston, C. Marchant, secy., 24 College St., college and vocational school. About $200,000.

Ont., Preston—Municipality, 200 bed hospital serving South Waterloo County, $200,000.

★**Ont., Sudbury**—City, H. P. McKechnie, clk., civic centre. About $500,000.

Sask., Saskatoon—Municipality, community recreational centre. $150,000.

PLANS UNDER WAY

★**Calif., El Centro**—City, 142 S. Sixth St., city hall, $100,000; jail, $25,000; fire station, $40,000; auditorium, $90,000; school, $300,000. Financing not provided. E. P. Ford, 142 S. Sixth St., dir. Pubs., city engr.

★**Calif., Glendale**—City, City Hall, police under way shop and maintenance building—street and sewer, $31,800; city hall addn., $216,000; library, $324,000. J. C. Albers, city engr .and street supt.

Calif., San Bernardino—San Bernardino Jr. College Dist., c/o W. J. Culver, Arcade son Bldg., San Bernardino, and J. J. Jones, 603 Farmers & Merchants Bank Bldg., Long Beach, archts., college bldgs. $300,000, $400,000.

Calif., South Gate—City, City Hall, plans 25% completed by Allen & Lutzi, 6112 Wilshire Blvd., Los Angeles, municipal auditorium and recreation bldg. $175,000. F. E. Alderman, City Hall, city engr.

Calif., South Gate—City, City Hall, plans 5% completed by Allen & Lutzi, 6112 Wilshire Blvd., Los Angeles, Hall of Justice, $175,000. F. E. Alderman, City Hall, city engr. CD 4/29—ENR 5/4.

★**Ind., Indianapolis**—World War Memorial Bd. Trustees, F. H. Henly, secy., 431 Meridian St., plans by Walker & Weed, 1240 Huron Rd., Cleveland, O., two 3 story bsmnt., stone, rein.-con., structural steel departmental bldgs. (addn. to World War Memorial), $420,000 each. Financing not provided.

★**Md., Towson**—Comrs. Baltimore County Court House, sketches by Wm. F. Stead, Jr., 2612 N. Charles St., Baltimore, 3 story stone masonry courthouse. $500,000.

Mass., Amesbury—Town, Bd. Trustees Amesbury Hospital, Amesbury, plans by Kendall Taylor & Co., Inc., 221 Columbus Ave., Boston, brick, steel nurses home, $150,000.

★**Mass., Norfolk**—Commonwealth of Massachusetts, Dpt. Mental Health, 1 Nashua St., Boston, plans completed by Coolidge, Shepley, Bullfinch & Abbott, 27 Court St., Boston, hospital, 7 brick bldgs., concrete fdns., for Criminally Insane, $2,400,000. Financing not provided. CD 11/5/43—ENR 11/11/43.

★**Mich., Alpena**—Bd. Educ., City Hall, plans by McCrath & Dohmen, 2631 Woodward Ave., Detroit, Zone 1, union school addn. to high school. $575,000. CD 9/14—ENR 10/5.

★**Mich., Ann Arbor**—City, Public Schools, City Hall, plans by Kasurin & Kasurin, Ann Arbor, school. $600,000. J. B. High, Ann Arbor High School, engr.

Mich., Ann Arbor—City, City Hall, preliminary plans under way 2 story, 60x65 ft., steel, brick and 1 story, 40x65 ft., steel, brick garage addn. $57,000. Geo. H. Sandenburgh, Ann Arbor, city engr.

Mich., Coldwater—City, City Hall, plans by Froehlich & Emery Engr. Co., Toledo Tower Bldg., Toledo, O., electric utility plant imprva., incl. steam generating equip., cooling tower, coal storage equip. $300,000.

Mich., Holland—City, City Hall, plans 25% completed by L. J. Sarvis, Battle Creek, municipal hospital addn. $240,000. CD 8/23—ENR 9/7.

Mich., Holland—City, City Hall, plans 10% completed by Louis C. Kingscott & Assoc., 208 Elm St., Kalamazoo, recreation bldg. $440,000. J. Zuidema, City Hall, city engr.

Mich., Monroe—City, City Hall, plans by R. M. Runbar, Reisig Bldg., public works garage. $60,000.

Mich., Plymouth—City Bd. Educ., City Hall, plans 20% completed by T. Moss, 282 S. Main St., school. $150,000. CD 10/12—ENR 11/16.

★**Mich., Waterford**—Waterford Twp. School Dist., 1150 Scott Lake Rd., R. 1, Pontiac, plans by F. Madison, 230 Wayne St., Oakland Bank Bldg., Royal Oak, school, $750,000. Financing not provided. CD 10/12—ENR 11/16.

Minn., International Falls—City, Bd. Educ., H. H. Ihrig, clk., plans by A. B. Meiander, 603 Alworth Bldg., Duluth, 1 story, 92x210 ft. Senior High School addn. $175,000.

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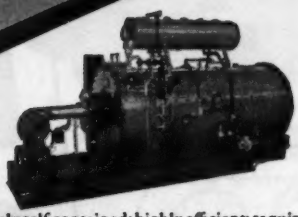

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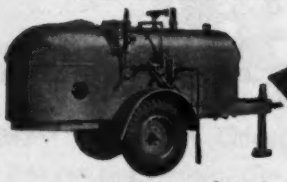

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POSTWAR PROJECTS (Cont'd.)

★**N. Y., Alfred**—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, plans by Haskell, Considine & Haskell, Hulett Bldg., Elmira, farm mechanics bldg., ED-9, $[illegible] 000; home economics bldg., ED-6, $[illegible] gymnasium and auditorium, ED-7, $[illegible] all at Alfred University, School of Agriculture, for Education Dpt., Education Bldg., Albany, Zone 1. CD 7/6—ENR 7/27.

N. Y., Batavia—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, plans by C. G. Ade, 31 Gibbs St., Rochester, power house and plant addn., at State School for the Blind, ED-8, for Education Dpt., Education Bldg., Albany, Zone 1. $50,000.

★**N. Y., Bedford Hills**—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, plans by Thompson, Holmes & Converse, 140 E. 39 St., New York, Zone 16, rehabilitation institution, Westfield State Farms, COR-3, for Correction Dpt., $574,800. CD 10/13—ENR 11/2.

N. Y., Brooklyn—Dpt. P. Wks., Municipal Bldg., New York, Zone 7, plans by G. A. Boehm, 2 W. 45 St., New York, Zone 19, alterations providing nursing training facilities at Greenpoint Hospital, HO-182, for Dpt. Hospitals, 125 Worth St., New York, Zone 13. $186,200. CD 5/19/43—ENR 5/27/43.

★**N. Y., Buffalo**—Dpt. P Wks., State Office Bldg., Div. Architecture, C. J. White, comr., Albany, Zone 1, reception bldg., addns., alterations, MH-11, $296,000; plans by York & Sawyer, 101 Park Ave., New York, Zone 17, medical and surgical bldg., MH-10, $1,250,000, both at Buffalo State Hospital, for Dpt. Mental Hygiene, State Office Bldg., Albany, Zone 1. CD 8/24—ENR 9/7.

N. Y., Canton—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, plans by J. M. Ryder, 122 Jay St., Schenectady, barn and poultry house at School of Agriculture, St. Lawrence University, ED-29, for Education Dpt., Education Bldg., Albany, Zone 1. $97,750.

N. Y., Cortland—Comrs. Cortland Co., plans 50% completed by H. G. Rice, 112 W. Dom. St., Rome, dormitory and infirmary for Cortland County Home. $200,000. W. J. Dwyer, Court House, supt. hys. CD 6/21—ENR 7/13.

★**N. Y., Dongan Hills**—Dpt. P. Wks., Municipal Bldg., New York, Zone 7, plans by Eggers & Higgins, 542 5th Ave., New York, Zone 19, construction, reconstruction at Sea View Hospital, HO-171, for Dpt. Hospitals, 125 Worth St., New York, Zone 13, $5,360,000.

★**N. Y., Dongan Hills**—Dpt. P. Wks., Municipal Bldg., New York, Zone 7, plans by C. B. Meyers, 31 Union Sq., New York, Zone 3, replacements and new bldgs., at Farm Colony, HO-170, for Dpt. Hospitals, 125 Worth St., New York, Zone 13. $8,500,000.

N. Y., Fredonia—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, plans by Tooker & Marsh, 101 Park Ave., New York, Zone 17, heating plant, ED-27, at State Teachers College, for Education Dpt., Education Bldg., Albany, Zone 1. $260,000. CD 9/20—ENR 10/5.

N. Y., Hudson—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, plans under way heating, electric service connections at Training School for Girls, SW-1, for Dpt. Social Welfare, 112 State St., Albany, Zone 1. $219,000. Div. Architecture, C. J. White, comr. CD 7/6—ENR 7/27.

★**N. Y., Marcy**—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, plans by Shreve, Lamb & Harmon, 11 E. 44 St., New York, Zone 17, medical, surgical and infirmary bldg., MH-3, $1,300,000; plans under way addnl. power and heating equip. and service connections, MH-13, $240,000, Div. Architecture, C. J. White, comr. Architecture, both at Marcy State Hospital, for Dpt. Mental Hygiene, State Office Bldg., Albany, Zone 1. CD 9/20—ENR 10/5.

★**N. Y., Morrisville**—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, plans by G. W. Betz, Kingston, gymnasium, heating plant and auditorium, ED-26, $435,[illegible]; Home Economics and Practical Arts Bldg., ED-30, $367,200, both at School of Agriculture, for Education Dpt., Education Bldg., Albany. CD 9/20—ENR 10/5.

★**N. Y., New Paltz**—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, plans by R. J. Reilly, 45 W. 45 St., New York, Zone 19, gymnasium and health education bldg., ED-32, at State Teachers College, for Education Dpt., Education Bldg., Albany, Zone 1. $501,000. CD 10/12—ENR 11/2.

★**N. Y., Oneonta**—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, plans by J. Russell White, 109 State St., Albany, administration and classroom bldg., ED-15, $405,000; auditorium, ED-16, $222,000; gymnasium and health bldg., ED-18, $342,[illegible]; home economics bldg., ED-22, $282,000; heating plant, service connections and imprvs. to grounds, ED-25, $311,000, all at State Teachers College, for Education Dpt., Education Bldg., Albany, Zone 1. CD [illegible] —ENR 9/7.

N. Y., Plattsburg—Dpt. P. Wks., State Office Bldg., Albany, plans by A. W. Inman, Plattsburg, home economics bldg., ED-10, for State Teachers College, for Dpt. Education, Education Bldg., Albany. $253,230. CD 8/24—ENR 9/7.

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★**N. Y., Poughkeepsie**—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, revises plans by DePace & Juster, 141 W. 46 St., New York. Zone 19, storehouse at Hudson River State Hospital, MH-49, for Dpt. Mental Hygiene, State Office Bldg., Albany, Zone 1. $978,450. CD 3/3—ENR 3/23.

★**N. Y., Sonyea**—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, plans underway altering Peterson Hospital and Lane Hall, MH-2, $100,000; plans by Crow, Lewis & Wick, 200 Fifth Ave., New York, medical and surgical bldg., MH-1, $1,315,000, at Craig Colony, for Dpt. Mental Hygiene, State Office Bldg., Albany, Zone 1.

N. Y., Westfield—Central School Dist. S. F. Nixon, pres. Bd. Educ., Westfield, plans by R. A. Fresburg, 1109 W. 3 St., Jamestown, brick, steel, concrete central school and bus garage. Over $300,000. Land rights not cleared, legal obstacles to be overcome and financing not provided.

O., Black Lick — Jefferson Twp. Rural School Dist., F. A. Souder, pres., Black Lick, plans under way school, high school addn. $240,000. Bond issue approved.

★**O., Cincinnati**—Hamilton Co. Bd. Comm., Court House, approved bond issue court house annex, $1,000,000. H. Coates, Court House, co. engr.

O., Lima — City, Bd. Trustees Lima Memorial Hospital, W. C. Hansborger, secy., plans by Thomas D. McLaughlin & Assoc., Dominion Bldg., city memorial hospital addn. $490,000. Bond issue approved. Cl 3/16—ENR 4/6.

O., Wooster—City, R. E. Fisher, mayor, City Bldg., approved bond issue hospital $375,000. R. R. Hollopeter, City Hall, asst. city engr.

Okla., Shawnee—City, T. E. Thompson, mgr., City Hall, plans 10% completed by Noftsger & Lawrence, 2507 N.W. 23 St., Oklahoma City, library. $150,000. Financing not provided.

Pa., Carlisle—Cumberland Co., Carlisle, plans by Lawrie & Green, 321 North Front St., Harrisburg, courthouse. $150,000.

★**Pa., Phila.**—Bureau Police, City Hall, plans 40% completed by J. Roletter, city archt., constructing, reconstructing police station houses and garages. Prop. 6-18 $437,965; Projs. SP-1 to 4, $300,000.

★**Pa., Phila.**—City, City Hall, plans 50% completed by J. Roletter, city archt., aquarium bldg., in Fairmount Park, Proj. Fp. 10, $1,100,000; plans 95% completed, completing art museum, Proj. Tp. 9, $4,000,000; plans 40% completed Commercial Museum and Convention Hall addns., repairs, Projs. Mc-5-9, $283,154, and Proj. Mc-13, $250,000; bldgs. for Bureau of Charities & Correction, Proj. WeC. 31, $200,000, and Proj. WeC. 30, $200,000; House of Correction bldg., Proj. WeC-2, $200,000; reception center, Personal Assistance Bureau, $192,000; bldgs. for Indigent and House of Correction, Proj. WeC. 5-25, $627,381; bldg., for Home for Indigent, WeC. 1, $200,000; plans 30% completed reconstructing Commercial Museum Exhibition Hall, Proj. Mc4, $2,255,833.

★**Pa., Phila.**—City, City Hall, plans 30% completed new heating sys., power plant and elevators in city hall, escalators in city hall annex, Projs. SE 2 to 4, $830,000; plans 40% completed by J. Roletter, city archt., Camp Happy addns., Proj. WeC. 3, 4, 26 to 29, $38,501.

★**Pa., Phila.**—Dpt. P. Health, City Hall, plans 30% to 60% completed by J. Roletter, city archt., bldgs., addns., repairs to Phila. General Hospital, Projs. HP. 1-13, $5,596,000; bldgs., addns., repairs to Phila. Hospital for Contagious Diseases, Projs. HPC 1-4, $3,169,030.

★**Pa., Phila.**—Dpt. Pub. Safety, City Hall, plans 30% completed by J. Roletter, city archt., central bldg. for fire alarm sys., SE. 1, $2,500,000.

Pa., Phila.—Fire Bureau, City Hall, plans 40% completed by J. Roletter, city archt., firehouse, Proj. S.F. 1, $150,000; firehouse, Proj. S.F. 2, $151,645; firehouse, Proj. S.F. 3, $150,000.

★**Pa., Phila.**—Free Library, City Hall, plans 50% completed by J. Roletter, city archt., branch library bldgs., Proj. TL. 1-2 $160,000, and Proj. TL. 3-5, $240,000; main Phila. library addn., Proj. TL. 6, $2,400,000.

★**Pa., Phila.**—Welfare Dpt., City Hall, plans 50% completed by Roletter, city archt., House of Detention for adult witnesses and untried prisoners, Proj. Hds. 1, $2,000,000; House of Detention for juveniles, Proj. Hdj. 1, $815,000.

Pa., West Chester—Homeopathic Hospital of Chester Co., West Chester, preliminary plans by Ballinger Co., 105 S. 12 St., Phila., hospital and nurses' home addns. $225,000. Funds being raised.

Tex., Beaumont—South Park Independent School Dist., Beaumont, plans 50% completed by Steinman & Goleman, Box 3347, Junior High School, $250,000.

Tex., Bowie—City, City Hall, plans 50% completed by Voelcker & Dixon, 913½ Indiana Ave., Fort Worth, 2 story, 100x140 ft. boys athletic center and storage bldg., brick concrete, etc. $80,000.

★**Tex., Corpus Christi**—Corpus Christi Ind. School Dist., Corpus Christi, plans by R. L. Vogler, 225 Oleander St., N. W. Hardy, 59 Country Club Place, Brock & Anderson, Jones Bldg., Junior High School, $450,000; 3 schools $150,000 each; 3 inter-

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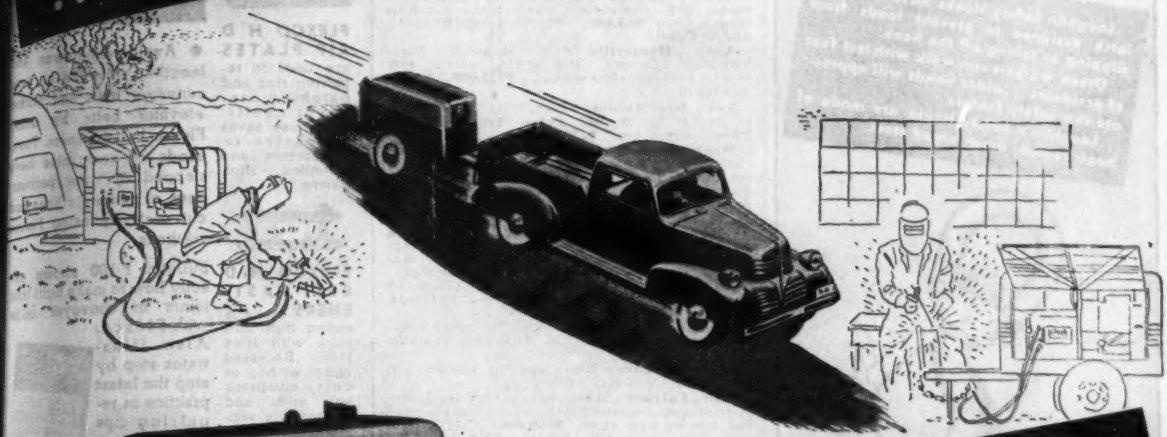

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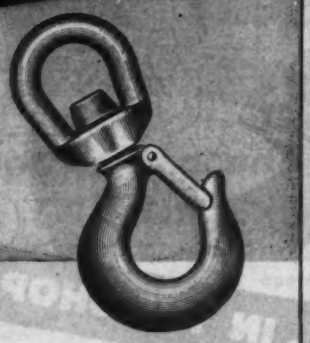

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Laughlin offers you the most complete line of hoist hooks on the market, and there are standard Laughlin fittings for almost any other requirement.

ROPE SOCKETS

Rope sockets of drop-forged steel are available in sizes ¼" to 1¾" (open pattern) and sizes ¼" to 1¾" (closed pattern), plain or galvanized finish.

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Weldless Turnbuckles are available in all types and sizes from ¼" x 4" to 2½" x 36". The largest turnbuckle ever made by drop-forging was produced by Laughlin . . . a giant of 440 pounds for a 50 ton boom.

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PORTLAND 6, MAINE

POSTWAR PROJECTS (Cont'd.)

mediary schools, $175,000 each. Plans 10% completed constructing units to old schools, $300,000. Bonds voted. CD 11/22.

Tex., Fabens—Fabens Public School Bd., Fabens, plans 10% completed by P. McGee, First National Bank Bldg., El Paso, high school. $275,000.

★**Tex., Houston**—City, City Hall, plans 70% completed health centers, $550,000; plans 15% completed civic center, $1,300,000; plans 35% completed library, $150,000; plans 25% complete coliseum expan., $250,000. Bonds voted. CD 10/26.

Tex., Huntsville—Sam Houston State Teachers College Bd. Regents, Huntsville, plans 10% completed mechanical machine shop. Over $40,000. CD 10/6—ENR 10/12, under Public.

Tex., Huntsville—Sam Houston State Teachers College, Huntsville, plans 40% completed vocation school. $275,000. Funds available.

Tex., San Antonio—City, City Hall, plans by A. B. & R. M. Ayres, Transit Tower Bldg., aquarium. $175,000.

Wash., Ellensburg — Central Washington College of Educ., Ellensburg, plans 90% completed by J. W. Maloney, Larson Bldg., Yakima, science bldg., $150,000; plans 60% completed heating plant addn., $75,000.

★**Wash., Pullman**—Washington State College, Pullman, plans by Whitehouse & Price, Hutton Bldg., Spokane, engineering-physics bldg., $175,000; plans by J. W. Maloney, Larson Bldg., Yakima, pharmacy-crime detection bldg., $150,000; plans by Rigg & Vantyne, Peyton Bldg., Spokane library, $200,000.

Wis., Viroqua—Vernon Co., Viroqua, highway garage, $145,000. M. J. Roidt, Viroqua, engr.

Alta., Calgary—Municipality, library. J. R. Wood, City Hall, engr.

Alta., Calgary—Municipality, City Hall, city auditorium, transportation equip. centre, city bus station and yard. $300,000. J. R. Wood, City Hall, engr. CD 10/7/43—ENR 10/14/43.

Ont., Forest Hill—Forest Hill Village, F. G. Gardner, reeve, 323 Lonsdale Rd., sketch plans prepared by Page & Steele, 20 Claire Ave. W., Toronto, brick, memorial centre on Eglinton Ave. and Spadina Rd., $300,000. N. MacNicol, 333 Lonsdale Rd., comr.

★**Ont., London**—Huron College, A. H. O'Neil, principal plans by O. Roy Moore, 260½ Dundas St., stone, brick, steel college bldgs., $517,000; special memorial tower for graduates killed overseas, $35,000.

Ont., Peterboro — Peterboro Separate School Bd., F. J. Overen, chn., plans by Jas. H. Hafta, 96 Bloor St. W., Toronto, 126x150 ft., brick, stone high school, $200,000. CD 11/22.

★**Ont., Toronto**—City, F. J. Conboy, mayor, City Hall, plans by G. N. Williams, Dpt. P. Wks. of Ontario, wholesale produce market, $1,000,000.

Ont., Wallaceburg—School Bd., Dr. W. Laurence, chm., plans by S. B. Coon & Son, 4 St. Thomas St., Toronto, high school, $150,000-$200,000.

★**Que., Montreal**—Dominion Govt., c/o P. O. Department, Langevin Bldg., Ottawa, Ont., exten. Terminal Post Office, Windsor and St. James Sts. $750,000. Dpt. P. Wks., Ottawa, Ont., engr.

READY FOR BIDS

★**N. Y., Batavia**—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, plans completed by C. C. Ade, 31 Gibbs St., Rochester, administration bldg., at State School for Blind, ED-70, for Education Dpt., Education Bldg., Albany, Zone 1. $829,202. CD 3/16—ENR 4/6.

★**N. Y., Brooklyn**—Dpt. P. Wks., Municipal Bldg., New York Zone 7, plans completed by James Gamble Rogers, 154 E. 46 St., New York, Zone 17. T. B. and chronic disease bldg., at Kings County Hospital, HO-35, for Dpt. Hospitals, 125 Worth St., New York, Zone 13. $2,731,092.

N. Y., Buffalo—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, plans completed addnl. boiler and equip., at State Institute for The Study of Malignant Diseases, H-28, $50,000. Div. Architecture, C. J. White, comr. CD 3/16—ENR 9/7.

★**N. Y., Genesee** — State Dpt. P. Wks., State Office Bldg., Albany, Zone 1, plans completed by J. Gamble Rogers, 154 E. 46 St., New York, Zone 17, heating plant, ED-72, $100,554; library, auditorium, music and classroom bldg., ED-23, $405,270; physical education bldg., ED-24, $246,013, all at State Teachers College, for Education Dpt., Education Bldg., Albany, Zone 1. CD 3/31—ENR 4/20.

N. Y., New York—Dpt. P. Wks., Municipal Bldg., Zone 7, plans completed by H. M. Prince, 101 Park Ave., Zone 17, Lower East Side Health Sub-Station, HL-33, for Dpt. Health, 125 Worth St., Zone 13. $98,000. CD 1/29/43—ENR 2/4/43.

★**O., Cincinnati**—Hamilton Co. Bd. Comm., Court House, plans completed by Samuel Hannaford & Son, Dixie Terminal Bldg., F. W. Garber, Union Central Annex, W. E. Bedenstein, 2nd National Bank Bldg., and W. C. Pistler, 4 W. 7 St., 5 story hospital unit accommodating 400 patients, administration bldg., residence and chapel, $3,500,000.

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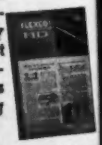

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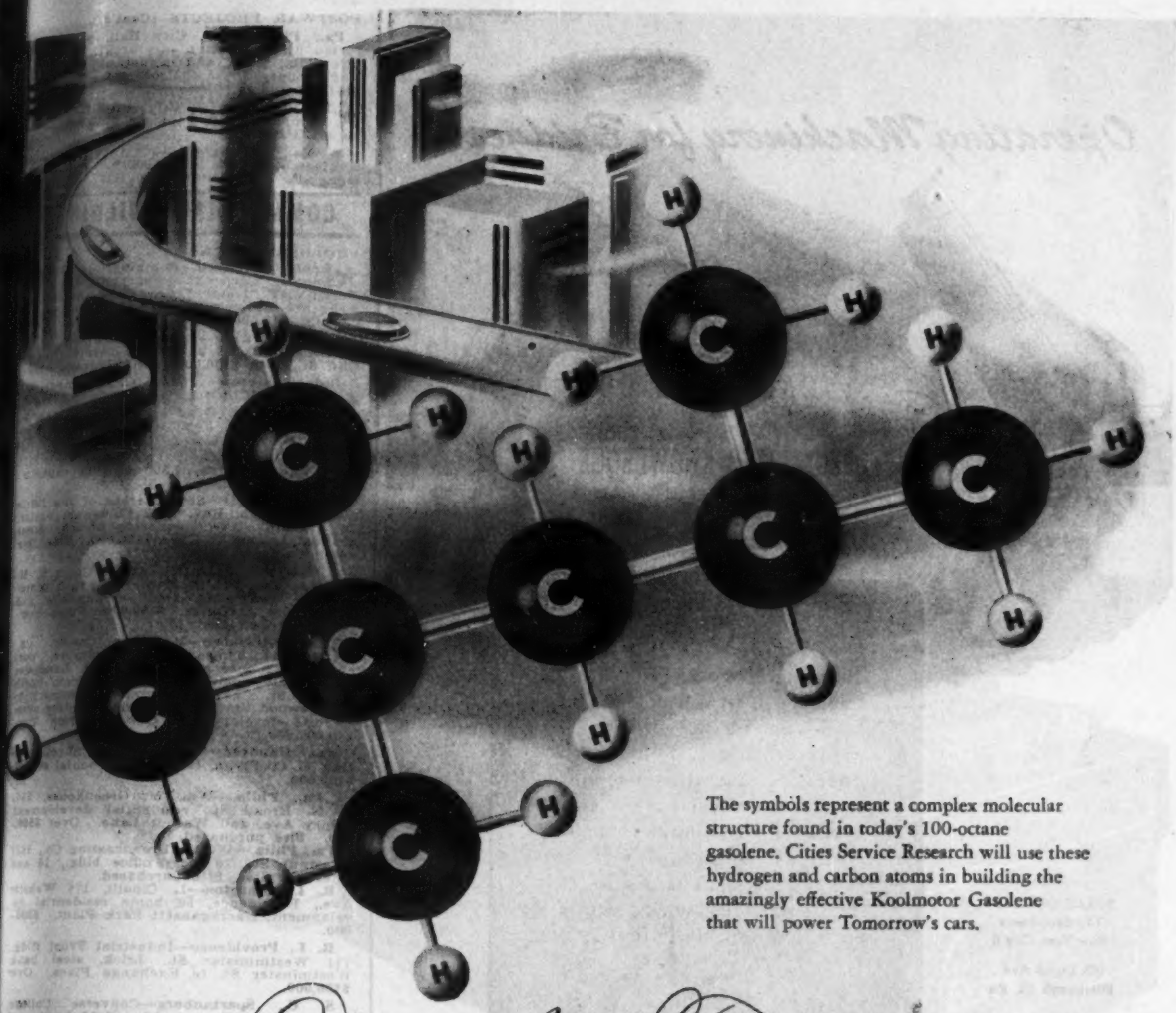

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POSTWAR PROJECTS (Cont'd.)

Pa., Phila.—City, City Hall, plans completed by J. Roletter, city archt., City Hall, new bldg., addn., and incinerator, Moyamensing County Prison, Proj. P.I. 18, 24, 37. $151,400.

★**Tex., Houston** — City, City Hall, plans completed police bldg. $750,000 bonds voted. CD 10/26.

W. Va., Huntington—City, City Hall, plans completed garage. $160,000. Funds. Available. P. S. Whitney, City Hall, city engr.

COMMERCIAL BUILDINGS

PROPOSED WORK

★**Conn., Hartford**—Communities Redevelopment Corp. 52 Vanderbilt Ave., New York, N. Y., 2 story garden apartment slum clearance housing, various undetermined locations. $10,000,000.

Conn., Norwich—Isadore Berkman, et al, 17 Broad St., brick, steel, concrete theater, Cliff St., Over $150,000. Poli Theaters, lessee.

Ind., Anderson—Modern City Lumber Co., Anderson, 25 homes, Bock Addn. $150,000.

★**Ind., South Bend**—Most Rev. John F. Noff, Bishop Fort Wayne Diocese, high school. $500,000.

La., Shreveport—Darrell George, 3521 Line Ave., theatre, 1,800 seating capacity $115,000-$150,000.

Mass., Everett—Ste. Theresa of the Little Flower Parish, Rev. T. P. Linehan, pastor, 20 Gledhill Ave., concrete, brick, stone parochial school. Over $150,000. Financing not provided.

O., Dayton—Salvation Army, Capt. E. M. Brewer, dir., 624 S. Main St., youth center housing swimming pool, gymnasium and club room facilities. $150,000. Fund campaign to open Dec. 15.

★**Pa., Ardmore**—Mahoney Constr. Co., Medical Times Bldg., Ardmore, purchased 123 acre site exten. from Lancaster Ave. to Wynnewood Rd., and from north end of St. Charles Borromeo Seminary to Wynnewood Station of Penn. R.R., for commercial development. Lower Merion Twp. $10,000,000.

Pa., Hanover—St. Joseph's Church, c/o Rev. E. O. Flynn, Hanover, parochial school. $150,000.

★**Pa., Phila.**—Wm. M. Greenhouse, 5601 N. Broad St., residential development, Henry Ave. and Walnut Lane. Over $800,000. Site purchased.

Pa., Phila.—WCAU Broadcasting Co., 1622 Chestnut St., 20 story office bldg., 16 and Chestnut Sts. Site purchased.

R. I., Cranston—L. Cipolli, 176 Webster Ave., Providence, 50 home residential development, Narragansett Park Plant. $360,000.

R. I., Providence—Industrial Trust Bldg., 111 Westminister St., brick, steel bank, Westminster St. to Exchange Place. Over $150,000.

S. C., Spartanburg—Converse College, Spartanburg, library addn., field house and dormitory. $500,000. Drive on for funds.

Ont., Ottawa—Chas. Ogilvy, Ltd., Nicholas and Rideau Sts., departmental store exten., Besserer St. $150,000. Site purchased.

Ont., Ottawa—F. W. Woolworth, Ltd., Rideau St., store exten., George and Sussex Sts. $175,000. Site purchased.

Ont., Windsor—C. R. Smith & Co., Ltd., 132 Ouelette Ave., department store. $150,000.

Que., Lachine—La Fabrique de Tres St. Sacrament, Rev. J. A. Gariepy, 50 Provot St., church at Dominion Park. About $175,000.

Que., Quebec City—Quebec Seminary, c/o Rev. Mgr. C. Gagnon, 7 St. Famille St., electrical engineering school. $200,000.

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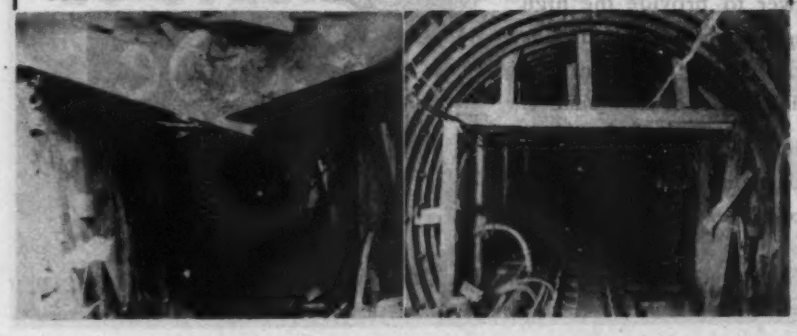

POSTWAR PROJECTS (Cont'd.)

PLANS UNDER WAY

★ **Conn., Hartford**—St. Francis Hospital, 114 Woodland St., E. J. Hickey, chn., plans 25% completed by L. A. Walsh, 11 W. Main St., Waterbury, hospital addns. incl. 3 story bldg. on Collins St., and 6 story bldg. on Woodland St. $2,000,000. CD 1/2—ENR 6/15.

Conn., Meriden—First Methodist Parish, W. Carey, chn., Bd. Trustees, 159 E. Main St., plans 90% completed by A. A. Dirlam, 142 Pleasant St., Malden, 2 story, basmnt., 50 x 125 ft., brick veneer church, Main St. $200,000.

Conn., New Haven—J. Chapince, 152 Temple St., plans by E. V. Bradley, 35 Whitney Ave., frame residential development, Morris Cove, $200,000.

Conn., Wethersfield—J. George Schilke, 18 Asylum St., Hartford, plans by G. Zunner, 182 High St., Hartford, 2 story, 100x150 ft., brick, steel, concrete business bldg., Silas Deane Hy. and Wells Rd. $150,000.

D. C., Wash.—St. Ann's Roman Catholic Church, 4400 Wisconsin Ave. N.W., plans by Henry D. Dagit & Son, 1329 Race St., Phila., Pa., church. $200,000.

★ **Ga., Conyers**—Monastery of the Holy Ghost, Conyers, plans by D. X. Murphy & Bros., Louisville Bank Bldg., Louisville, Ky., concrete, masonry bldgs., incl. church, school and housing facilities for priest, nuns, etc. $7,000,000.

★ **Kan., Leavenworth**—St. Vincent's Orphanage, c/o Bishop P. C. Sculte, Leavenworth, plans by Brinkman & Hagan, Citizens Bank Bldg., Emporia, orphanage bldg. $500,000.

★ **Md., Silver Spring**—Indian Spring Country Club, Colesville Rd., plans by F. Ackerman, 551 Fifth Ave., New York 17, N. Y., club house. $700,000.

Mass., Worcester—Worcester Street Railway Co., 107 Main St., plans completed by Cram & Ferguson, 248 Boylston St., Boston, 3 story, bsmnt., 60x125 ft., brick, stone office bldg., concrete fdn. $300,000. Financing not provided. CD 6/9—ENR 7/13.

★ **Mo., Kansas City**—Rockhurst College, 53 St. and Troost Ave., Rev. W. H. McCabe, pres., plans under way 5 bldgs., incl. chapel, library, student dormitory and laboratory bldgs., and imprvs. $1,000,000.

Mo., St. Louis—Faith Hospital Assn., Dr. A. J. Signorelli, dir., 2800 N. Taylor Ave., Zone 15, preliminary plans completed by Jos. D. Murphy, Givens Hall, Washington University, Lindell and Skinker Blvds., Zone 5, and A. G. Corrubia, 6144 McPherson Ave., Zone 12, three 8 story modernistic hospital, featuring Solar-type construction on site fronting 165 ft. x 543 ft. in 3000 block of North Kingshighway Blvd. Over $150,000. Site purchased.

★ **N. J., Ridgewood**—Ridgewood Hospital Assoc., 25 W. Ridgewood Ave., plans by Eggers & Higgins, 542 5 Ave., New York, N. Y., 4 story, brick hospital. $500,000.

★ **O., Cleveland**—Sears, Roebuck & Co., Chas. K. Kellstadt, genl. mgr., 3501 Carnegie Ave., plans by Nimmons, Carr & Wright, 333 N. Michigan Ave., Chicago, Ill., department stores addn., incl. main bldg. addn., at 3501 Carnegie Ave. and west side store of 250,000 sq. ft., and erect bldg. of 30,000 sq. ft. and double space at 4200 Lakeside Ave. $1,500,000. Land rights cleared and financing provided. CD 1/10—ENR 1/27.

Okla., Elk City—Community Hospital, Elk City, plans 50% completed by Hall & Associates, Colcord Bldg., Oklahoma City, nurses home bldg., laundry plant, power plant. $150,000.

Pa., Chambersburg—Wilson College, c/o W. H. Prentis, Jr., Lancaster, plans under way by The Office of Charles Z. Klauder, 1429 Walnut St., Phila., college dormitory, $320,000; student-alumnae bldg., $250,000.

Pa., Phila.—Frankford Hospital, E. L. Miller, supt., Frankford and Wakeling St., plans by J. Walter Eastburn, 4656 Penn St., 4 story hospital. $250,000.

★ **Tex., Dallas**—Carl M. Brown & Associates, 1505 El Campo St., plans 15% completed shopping village, etc. $2,000,000. Hare & Hare, 114 W. 10 St., Kansas City, Mo., consult. engrs.

★ **Tex., Dallas**—A. Harris & Co., Main and Akard Sts., plans 75% completed by Geo. L. Dahl, So. Life Annex Bldg., two 8 story bldgs. adjacent to existing bldg., incl. complete air conditioning, etc. $750,000. CD 7/12—ENR 7/27.

Tex., Dallas—R. Woods Auto Co., 2100 Ross St., plans 45% completed by H. K. Smith, 4625 N. Versailles St., display and sales bldg. $150,000. Financing available.

Tex., Fort Worth — University Baptist Church, 3310 West Cantey St., plans by W. G. Clarkson Co., 609 First National Bank Bldg., gothic architecture church, Forest Park Blvd. and Park Hill. $300,000.

★ **Tex., Houston**—Herman Hospital Estate, c/o Col. J. Anderson, Stewart Bldg., plans by K. Franzheim, 2306 Crawford St., and Hedrick & Lindsley, 811 Southern Standard Bldg., doctor's office bldg., hospital, and miscellaneous bldgs. $3,000,000. CD 4/10—ENR 4/20.

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(from STEEL 6-12-44)

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POSTWAR PROJECTS (Cont'd.)

Tex., San Antonio—Christ Episcopal Church, 305 W. Russell St., plans by A. B. & R. M. Ayres, Transit Tower Bldg., church. $150,000.

Tex., San Antonio—West End Baptist Church, Culebra Rd., plans 50% completed by B. W. Spillman & Son, Hicks Bldg., 1 and 2 story, brick, hollow tile, concrete church and educational bldg. $150,000. Financing available.

Tex., Teague—Methodist Church, Teague, plans 10% completed by H. C. Moore, 2001 W. Alabama St., 120x130 ft., masonry brick etc., church. $150,000.

Wash., Spokane—Deaconess Hospital, Post and 4 Sts., plans by N. Thompson, Hutton Bldg., nurses' home addn. $250,000. Perry W. Swern & Associates, 19 S. La Salle St., Chicago, Ill., consult. engrs.

Alta., Edmonton—Canadian National Rys., H. A. Dixon, ch. engr., 360 McGill St., Montreal, Que., 100 room MacDonald Hotel addn. $250,000.

B. C., Vancouver—Famous Players Canadian Corp., 736 Granville St., rein.-con. theatre and stores bldg., with parking lot on 335 ft. frontage on 41 Ave. near East Blvd. $250,000. Townley & Matheson, 1376 Hornby St., archts.

READY FOR BIDS

Conn., Bridgeport—F. W. Woolworth Co., 1009 Main St., plans completed 3 story department store, Main St., $150,000. E. S. Glover, 75 State St., Albany, New York, N. Y., supt. of construction. CD 4/14/44—ENR 5/6/44.

Conn., Hartford—Mt. Sinai Hospital, 119 Capitol Ave., plans completed by Ebbets & Frid, 15 Lewis St., hospital addn., alterations, Blue Hill and Tower Aves. $250,000. CD 2/4—ENR 3/10, under Public

Mass., Springfield — Wesson Memorial Hospital, High St., plans completed by Ebbets & Frid, 15 Lewis St., Hartford, Conn., 4 story, 45x65 ft., brick, steel hospital. $250,000.

N. Y., New York—Aral Holding Corp., 400 E. Fordham Rd., plans completed by H. B. Rutkins, 400 E. Fordham Rd., 6 story, 86x177 ft. apartment, Townsend Ave. near Mt. Eden Ave. $275,000.

★**N. Y., New York**—Chelville Estates, Inc., 150 W. 24 St., Zone 1, plans completed J. J. Furman, 303 W. 42 St., Zone 18, 13 story, 89 x 96 ft. apartment, 35-41 E. 61 St. $500,000.

N. Y., New York—Manhattan Properties, Inc., T. Backer, pres., 295 5th Ave., plans completed by H. M. Prince, 101 Park Ave., Zone 17, 23 story office bldg., 635 8th Ave., corner 41 St., $350,000; 10 story apartment, 3 E. 81 St., $100,000.

N. Y., New York—Henry C. Nagel, 147 E. 61 St., Zone 21, plans completed by H. I. Feldman, 415 Lexington Ave., Zone 17, 12 story, 83 x 100 ft. apartment, 28-36 W. 73 St. $450,000.

N. Y., New York—1225 Nelson Ave. Corp., 400 E. Fordham Rd., plans completed by H. B. Rutkins, 400 E. Fordham Rd., 6 story, 75x84 ft. apartment, Bainbridge Ave. near 197 St., $140,000; 6 story apartment, Walton Ave. near 183 St., $270,000.

N. Y., New York—2050 Anthony Ave. Corp., c/o H. B. Rutkins, archt., 400 E. Fordham Rd., plans completed 6 story, 62x81 ft. apartment Valentine and Burnside Aves. $150,000.

CONTRACTS AWARDED

★**Vt., St. Albans**—Kreba Memorial Hospital, Inc., St. Albans, 5 story, bsmt., 45x135 ft., with 45x83 ft. and two 42x70 ft. wings, brick, stone hospital and nurses' training school and home, concrete fdn., to Turner Constr. Co., 420 Lexington Ave., New York 17, N. Y. Est. $600,000. Voorhees, Walker, Foley & Smith, 101 Park Ave., New York, N. Y., archts. Published incorrectly under Commercial—current work. CD 11/17—ENR 11/23.

INDUSTRIAL BUILDINGS

PROPOSED WORK

Conn., Stamford—PLANT—Atlas Powder Co., 269 Ludlow St., dyeing unit plant, brick, concrete, Canal and Henry Sts. Over $40,000.

Conn., Stamford — MARINE PLANT — Doane Marine Works, Wallace St., brick marine plant, Wallace St. $45,000.

Conn., Stamford—FACTORY—New England Lacquer Co., Magee Ave., brick factory addns. $40,000.

Ind., Indianapolis—FACTORY—Eli Lilly & Co., Louisiana and Delaware Sts., large factory addn. $100,000 or more.

Mass., Uxbridge—MILL—Uxbridge Worsted Co., Uxbridge, superstructure 2 story, 125x130 ft., brick textile mill. $100,000. E. J. Cross Co., 150 Prescott St., Worster, now building fdn.

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POSTWAR PROJECTS (Cont'd.)

Tex., Childress—MOTOR SHOP, etc.—C. B. Gloar Motor Co., Childress, motor shop and storage. Over $50,000.

Newfoundland, St. John's—PLANT—Industrial Development Bd., St. John's, plant producing alcohol from waste sulfite liquors from pump mills. $300,000.

N. S., Halifax—PLANT—Brookfield Bros. Ltd., 131 Upper Water St., brick mfg. plant exten. $50,000.

N. S., Halifax—PACKING PLANT—Burns & Co., Ltd., 59 Upper Water St., packing plant addns. $50,000.

Ont., Galt—PLANT—P. W. Gardiner & Son, Ltd., Galt, remodeling plant. $40,000.

Ont., Hespeler — PLANT — Hespeler-St. Mary's Wood Specialties, Ltd., Hespeler, plant extens., imprvs. $40,000.

Ont., London—BOILER HOUSE, etc.—W. R. Kernohan Lumber Co., Ltd., 152 Horton St., boiler house, dry kiln, etc.

Ont., Toronto — FACTORY — Cook Clothing Co., Ltd., 144 W. Front St., factory. $50,000.

Sask., Swift Current—BAKERY—Swift Current Flour Mills, Ltd., D. R. Neusome, owner, Swift Current, modern bakery addn. About $75,000.

Sask., Swift Current—PLANT—Swift Current Produce Co., Ltd., Swift Current, canning plant, etc. $40,000.

Sask., Swift Current—PLANT—The Swift Current Produce Co., Ltd., C. I. Ironside, pres., Swift Current, poultry canning and egg-cracking plant. About $50,000.

Sask., Swift Current—PLANT—The Swift Current Sun, J. Greenblat, editor, Swift Current, plant, 1 Ave. E. About $60,000.

PLANS UNDER WAY

★**Calif., Vernon**—WAREHOUSE, etc.—Owner, c/o A. C. Martin, archt., 233 Higgins Bldg., Los Angeles, working drawings started 2 story masonry warehouse and office bldg. $800,000.

Conn., Bridgeport — FACTORY — Warner Brothers Co., 326 Lafayette St., demolishing old bldgs., building 2 story, brick, steel factory housing folding box and printing depts., Warren and Gregory Sts. Over $40,000. Ford, Bacon & Davis, Inc., 39 Bway., New York, N. Y., consult. engr.

Conn., Milford — FACTORY — American Windshield Specialty Co., 442 Boston Post Rd., brick factory unit and addns. $40,000. L. F. Caproni, 1221 Chapel St., New Haven, consult. engr.

Conn., New Haven — FACTORY — New Haven Clock Co., 133 Hamilton St., 2 story, 42x141 ft., brick, steel factory. $50,000. L. F. Caproni, 1221 Chapel St., New Haven, consult. engrs.

★**Ill., Chicago**—PLANT—American Paper Goods Co., 1527 W. Washington St., plans by The Austin Co., 510 N. Dearborn St., 1 story, plant on 300x637 ft. site, $500,000. Land acquired.

O., Barberton—FACTORY—Sun Rubber Co., T. Nagel, in charge, Barberton, plans by R. S. Firestone, 175 W. Bowery St., and bids soon rebuilding 1 story, 100x200 ft. factory, using present walls. $50,000.

O., Cincinnati—PLANT—Post Glover Electric Co., E. A. Bosner, Jr., treas., 221 W. Third St., plans by Felsberg & Gillespie, Ingalls Bldg., manufacturing bldg. $50,000.

O., Dayton—FACTORY—Field Abrasive Co., 127 S. Main St., plans by H. Griffith, County Bldg., 1 story, 60x130 ft., brick, steel factory. $40,000.

★**Tex., Houston**—PLANT—Wm. Cameron & Co., Inc., 2600-10 Texas St., plans under way plant expan. Over $500,000. Purchased 5 acre site.

Alta., Edmonton—DEPOT—Canadian National Rys., H. A. Dixon, ch. engr., 360 McGill St., Montreal, Que., exten. on east side of depot and construct another story, to present 2 story structure, $200,000.

Alta., Edmonton—RAILWAY STATION—Canadian National Rys., H. A. Dixon, ch. engr., 360 McGill St., Montreal, Que., union railway station. $400,000.

★**Ont., Toronto**—PLANT—Canadian Furniture & House Furnishings Mart, H. P. Parker, pres., Toronto, plans by Marani & Morris, 46 Bloor St. W., 11 story, 120x380 ft., rein.-con. wholesale furniture market, $2,500,000.

Que., Montreal — PLANT — Laura Second Candy Co., Ltd., 369 Viger St., plans by D. E. Painchaud, 2502 Lafontaine Park, 6 story, 90x93 ft., steel plant addn. $100,000.

READY FOR BIDS

O., Findlay—PLANT—Krantz Old Dutch Brewery, S. Secor, pres., Findlay, plans completed by F. A. Kotonke, 11407 Continental Ave., Cleveland, plant alterations, $55,000.

Tex., Harlingen—WAREHOUSES, etc.—Arroyo Colorado Navigation Dist., C. H. Purdy, chn., Rio Grande Bldg., Harlingen, plans completed terminal warehouse and other bldgs. for canal terminal, $225,000. CD 5/17—ENR 5/25, under Public.

CONTRACTS AWARDED

Tex., San Antonio—FACTORY—Sanitary Mattress Factory, 322 Fredericksburg Rd., general contract demolishing, reconstructing 1 story mattress factory shop bldg., brick, tile, to G. Falbo & Co., Morales St., approx. $40,000.

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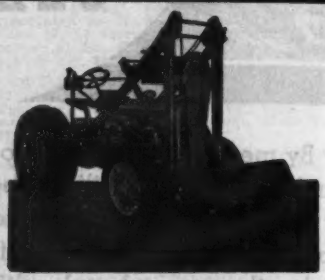

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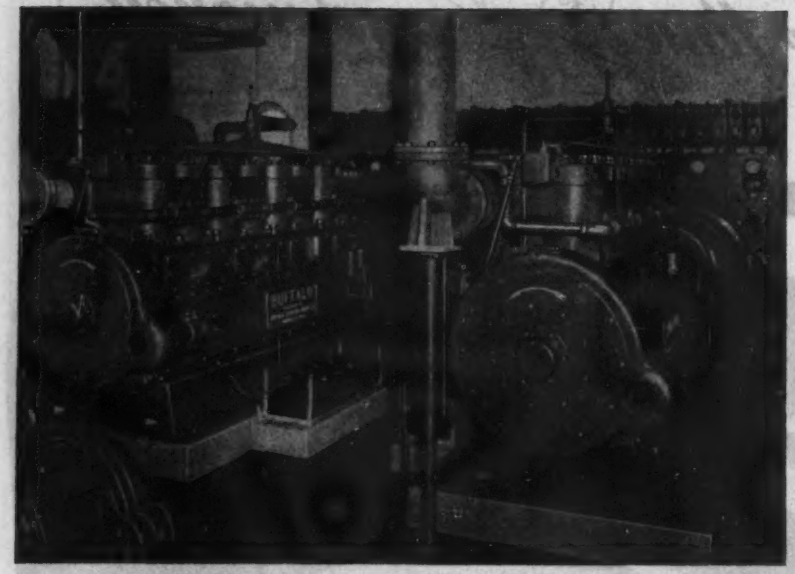

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PROPOSED WORK

Ala., Abbeville — AIRPORT — City, City Hall, grading, etc., airport, $80,000. CAA will help finance.

★ **Ala., Alexander City**—AIRPORT—City, City Hall, airport grading, paving, etc. $870,000. CAA will help finance.

Ala., Andalusia — AIRPORT — City, City Hall, airport grading, etc. $130,000. CAA will help finance.

Ala., Athens—AIRPORT—City, City Hall, airport grading, etc. $130,000. CAA will help finance.

Ala., Atmore—AIRPORT—City, City Hall, airport grading, etc. $130,000. CAA will help finance.

Ala., Auburn-Opelika — AIRPORT—Cities, airport grading, paving, lighting, etc. $365,000. CAA will help finance.

Ala., Bay Minette—AIRPORT—City, City Hall airport grading, etc. $80,000. CAA will help finance.

Ala., Bessemer — AIRPORT — City, City Hall, airport grading, etc. $80,000. CAA will help finance.

★ **Ala., Birmingham**—AIRPORT—City, City Hall, airport grading, paving, lighting, etc. $2,070,000. CAA will help finance.

Ala., Bridgeport — AIRPORT — Town, airport grading, etc. $80,000. CAA will help finance.

Ala., Butler — AIRPORT — Town, airport grading, etc. $80,000. CAA will help finance.

Ala., Camden—AIRPORT—Town, airport grading, etc. $130,000. CAA will help finance.

Ala., Carrollton — AIRPORT — Town, airport grading, etc. $130,000. CAA will help finance.

Ala., Center — AIRPORT — Town, airport grading, etc. $130,000. CAA will help finance.

Ala., Centerville—AIRPORT—Town, airport grading, etc. $80,000. CAA will help finance.

Ala., Chatom—AIRPORT—Town, airport grading, etc. $130,000. CAA will help finance.

Ala., Citronelle—AIRPORT—Town, airport grading, etc. $80,000. CAA will help finance.

Ala., Cianton—AIRPORT—Town, airport grading, lighting, etc. $245,000. CAA will help finance.

Ala., Clayton—AIRPORT—Town, airport grading, etc. $80,000. CAA will help finance.

Ala., Columbiana—AIRPORT—Town, airport grading, etc. $130,000. CAA will help finance.

★ **Ala., Cullman**—AIRPORT—Town, airport grading, paving, lighting, etc. $650,000. CAA will help finance.

★ **Ala., Decatur** — AIRPORT — City, City Hall, airport grading, paving, etc. $670,000. CAA will help finance.

Ala., Enterprise — AIRPORT — City, City Hall, airport grading, etc. $80,000. CAA will help finance.

Ala., Eufaula—AIRPORT—Town, airport grading, paving, etc. $400,000. CAA will help finance.

Ala., Eutaw—AIRPORT—Town, airport grading, etc. $130,000. CAA will help finance.

Ala., Fairhope—AIRPORT—Town, airport grading, etc. $80,000. CAA will help finance.

Ala., Fayette—AIRPORT—Town, airport grading, etc. $130,000. CAA will help finance.

Ala., Fort Morgan (mail Dauphin Island)—AIRPORT—Town, airport grading, etc. $130,000. CAA will help finance.

Ala., Fort Payne—AIRPORT—Town, airport grading, etc. $80,000. CAA will help finance.

Ala., Greenville—AIRPORT—Town, airport grading, paving, etc. $260,000. CAA will help finance.

Ala., Guntersville—AIRPORT—Town, airport grading, paving, etc. $220,000. CAA will help finance.

Ala., Haleyville—AIRPORT—Town, airport grading, etc. $135,000. CAA will help finance.

Ala., Hamilton—AIRPORT—Town, airport grading, etc. $80,000. CAA will help finance.

Ala., Hayneville—AIRPORT—Town, airport grading, etc. $80,000. CAA will help finance.

Ala., Huntsville—AIRPORT—City, airport grading, paving, lighting, etc. $335,000. CAA will help finance.

Ala., Jackson—AIRPORT—Town, airport grading, etc. $80,000. CAA will help finance.

Ala., Jasper — AIRPORT — Town, airport grading, etc. $130,000. CAA will help finance.

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POSTWAR PROJECTS (Cont'd.)

Ala., Lafayette—AIRPORT—City, airport grading, etc. **$80,000.** CAA will help finance.

Ala., Livingston—AIRPORT—Town, airport grading, etc. **$80,000.** CAA will help finance.

Ala., Lockhart-Florala — AIRPORT — Towns, airport grading, etc. **$80,000.** CAA will help finance.

Ala., Luverne—AIRPORT—Town, airport grading, etc. **$120,000.** CAA will help finance.

Ala., Marion—AIRPORT—Town, airport grading, etc. **$120,000.** CAA will help finance.

Ala., Monroeville—AIRPORT—Town, airport grading, etc. **$80,000.** CAA will help finance.

Ala., Montevallo—AIRPORT—Town, airport grading, etc. **$80,000.** CAA will help finance.

Ala., Oneonta—AIRPORT—Town, airport grading, etc. **$80,000.** CAA will help finance.

Ala., Ozark—AIRPORT—Town, airport grading, etc. **$80,000.** CAA will help finance.

Ala., Pell City—AIRPORT—Town, airport grading, paving, lighting, etc. **$386,000.** CAA will help finance.

Ala., Piedmont—AIRPORT—City, airport grading, etc. **$80,000.** CAA will help finance.

Ala., Red Bay—AIRPORT—Town, airport grading, etc. **$80,000.** CAA will help finance.

Ala., Roanoke—AIRPORT—Town, airport grading, etc. **$120,000.** CAA will help finance.

Ala., Russellville—AIRPORT—Town, airport grading, etc. **$80,000.** CAA will help finance.

Ala., Scottsboro—AIRPORT—City, airport grading, etc. **$80,000.** CAA will help finance.

Ala., Sylacauga—AIRPORT—City, airport grading, etc. **$230,000.** CAA will help finance.

Ala., Thomasville—AIRPORT—City, airport grading, etc. **$80,000.** CAA will help finance.

★ **Ala., Tuscaloosa**—AIRPORT—City, airport grading, paving, etc. **$650,000.** CAA will help finance.

★ **Ala., Tuskegee**—AIRPORT—City, airport grading, paving, etc. **$650,000.** CAA will help finance.

Ala., Union Springs—AIRPORT—Town, airport grading, etc. **$80,000.** CAA will help finance.

Ala., Uniontown—AIRPORT—Town, airport grading, etc. **$80,000.** CAA will help finance.

Ala., Warrior—AIRPORT—Town, airport grading, etc. **$80,000.** CAA will help finance.

Ala., Winfield—AIRPORT—Town, airport grading, etc. **$80,000.** CAA will help finance.

Conn., Middletown—STADIUM, etc.—City, Supt. Schools, 251 Court St., Middletown, stadium and field house, incl. rest room, first aid room, lockers, Woodrow Wilson High School. **$25,000.**

Ill., Springfield—STADIUM and ATHLETIC FIELD—Springfield School Dist., c/o School Bd., Springfield, voted **$360,000** bonds, athletic field stadium and athletic field, etc. CD 10/11—ENR 11/2.

Ia., Perry—AIRPORT—City voted bonds airport **$50,000.** CD 5/12—ENR 6/1.

★ **Mass., Agawam** — AIRPORT — City P. Wks. Dpt., Municipal Bldg., W. L. Costigan, chn. Aviation Comn., municipal airport on Bowles Race Track Property, incl. land work, two 500x4,000 ft. landing strips, paved strip 150 ft., taxi strips, **$500,000.**

Mass., Fitchburg—STADIUM—City, Memorial Stadium Comn. for World War 2 Veterans, H. G. Bowen, chrn., 250 Main St., concrete, steel memorial stadium. Over **$100,000.** Financing not provided.

N. H., Hooksett—AIRPORT—Bayside Flying Service, Inc., RFD 4, Manchester, airport expan., incl. 65 x 85 ft. prefabricated hangar, Route 3-A. Over **$25,000.**

N. Y., Mount Pleasant—SCHOOL GROUND IMPROVEMENTS—Mt. Pleasant and New Castle Central School Dist. 4, Mt. Pleasant, school ground imprvs. **$36,000.** State Aid Planning Funds allotted.

Ohio—RURAL ELECTRIC LINES—Inter-County Rural Electric Co-operative, Hillsboro, 600 mi. rural electric lines, Highland Co. **$50,000.**

O., Toledo—SWIMMING POOLS—City Planning Comn., City Hall, swimming pools in Navarre Park, Riverside Park, South End and Ottawa Park, **$100,000** each, CD 3/16—ENR 4/6.

R. I., Woonsocket—WAR MEMORIAL—City, M. Dursin, chn. Veterans Memorial Comn., City Hall, World War II memorial. Over **$25,000.** Financing not provided.

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WASHINGTON, D. C.

The plywood beams were tested in the Materials Testing Laboratory of the University of Washington College of Forestry, with the assistance of Professor Bror Grondahl. A 200,000 lb. Olsen Testing Machine was used and A. S. T. M. provisions were observed.

Now available to engineering designers, laboratory report of tests on

Beams and Girders built of Douglas Fir Plywood

The recent use of I-beams, girders and box-beams with plywood webs for numerous industrial buildings has aroused considerable interest among the nation's engineering designers. Previous reports,* published by the Douglas Fir Plywood Association laboratory, have covered the results of exploratory tests on relatively small beams.

The latest laboratory report details the fabrication and testing of 13 full-scale plywood beams 25 feet in length and from 18 to 36 inches in depth. An outline of fabrication methods, a discussion of fabricating techniques and an analysis of material and labor costs are covered in Part One of the report.

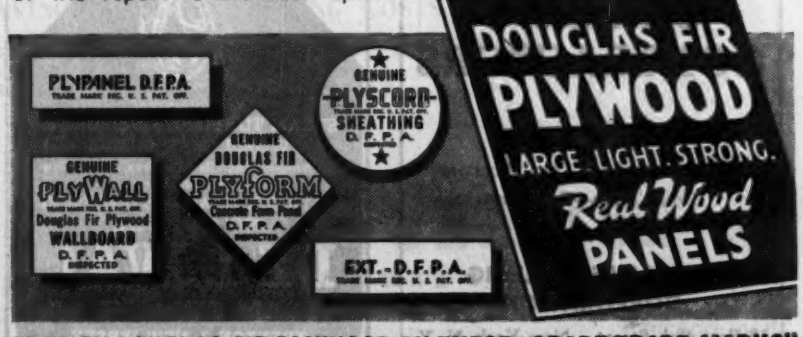
Part Two discusses the test methods, strain gauge results, test results, observation and conclusions. In general, the conclusion justified by the results of these and previous tests is that built-up plywood beams can be accurately designed by using recognized engineering formulas and methods, and that such members will perform according to the elastic theory.

The full report is of interest to engineering designers concerned with the utilization of plywood as a structural material. A copy of the report is available upon request to N. S. Perkins, Technical Director, Douglas Fir Plywood Association, Tacoma 2, Washington.

*No. 27. "Fundamental Shear Stress Values and Exploratory Tests of Small Built-up Beams."

No. 28. "Stress Distribution and Ultimate Load Tests on Eight-Foot Plywood Girders."

No. 29. "Load Tests on Additional Eight-Foot Plywood Girders."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Line of Ric-wiL conduit from anchor to boiler house (top, left). Note shallow, narrow trench.

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POSTWAR PROJECTS (Cont'd.)

★**R. I., Woonsocket**—AIRPORT—City, W. A. McCarthy, chn. Aviation Comm. airport, incl. land construction, hangars, bldgs., runways, taxi strips, $300,000-$500,000.

Tex., Amarillo—AIRPORT FACILITIES—Southwest Airways Co., c/o Love Field, Dallas, airport facilities for 2-way route. Over $40,000.

Wash., Walla Walla—PARK, etc.—City, H. G. West, mayor, City Hall, bond issue proposed in spring, veterans memorial park with swimming pool, golf course, athletic fields, tennis courts, badminton courts, playground equip., picnic grounds, etc. $200,000.

B. C., Vancouver—FLYING BOAT TERMINAL — Municipality, high-traffic flying boat terminal. Over $100,000.

Man., Brandon — STREET LIGHTING SYSTEM—Municipality, street lighting sys. $35,000.

★**Nova Scotia**—POWER DEVELOPMENT—Dominion Govt., Ottawa, Ont., tidal power development in Upper Fundy area. $25,041,000.

Ont., Barrie—AIRPORT—Town, airport, $75,000. W. M. Satter, c/o owner, engr.

Ont., Hamilton—Municipality, high-traffic flying boat terminal. Over $100,000.

Ont., Ottawa—COMFORT STATIONS—Municipality, 2 comfort stations, near National War Memorial. $75,000.

Ont., Ottawa—FLYING BOAT TERMINAL—Municipality, high-traffic flying boat terminal. Over $100,000.

★**Ont., Sault Ste. Marie**—POWER DEVELOPMENT—Hydro-Electric Power Comm. of Ontario, University Ave., Toronto, survey completed 150,000 hp. power development on Mississanga River east of here. $1,000,000.

Ont., Toronto—FLYING BOAT TERMINAL—Municipality, high-traffic flying boat terminal. Over $100,000.

Que., Montreal—FLYING BOAT TERMINAL—Municipality, high-traffic flying boat terminal. Over $100,000.

Que., Saint Malachie—FIRE ALARM SYSTEM—Municipality, L. H. Lafontaine, secy., City Hall, fire alarm sys. $25,000.

Que., Three Rivers—TUNNEL—Municipality, G. Beaumier, clk., tunnel on Des Cheneaux Rd. $50,000. P. E. Dufresne, City Hall, engr.

PLANS UNDER WAY

Calif., El Centro—SWIMMING POOLS—City, 142 S. Sixth St., west side swimming pool, $50,000; east side swimming pool, $30,000. E. Paul Ford, 142 S. Sixth St., Dir. P. Wks. and city engr.

Calif., Glendale—STREET LIGHTING, etc.—City, City Hall, plans under way street lighting, Brand Blvd., $130,000; traffic controls, Glenoaks Blvd., $43,500; traffic signals, city wide, $44,100. J. C. Albers, City Hall, city engr. and street supt.

Calif., San Mateo — PARK IMPROVEMENTS, etc.—City, City Hall, plans 20% completed park imprvs., fire alarm sys., parking lots. $431,164. Financing not provided. W. D. Soule, City Hall, city engr.

Calif., South Gate—SWIMMING POOL—City, City Hall, plans 25% completed by Allen & Lutzi, 6112 Wilshire Blvd., Los Angeles, swimming pool, $150,000. F. E. Alderman, South Gate, city engr. CD 4/20—ENR 5/4, under Public Bldgs.

Ill., Blue Island—LIGHTING SYSTEM—City, City Hall, plans 20% completed modern ornamental street lighting sys. $32,000. A. L. Fox, City Hall, city engr.

Ia., Boone—AIRPORT—City, City Hall, plans 50% completed Class 2 airport, $60,000. Land rights not cleared, financing available. Stanley Engineering Co., Muscatine, consult. engr. CD 9/28—ENR 10/19.

Ia., Clinton — AIRPORT — Airport Comm., City Hall, plans 75% completed acquisition, construction of airport, $150,000. B. R. Anderson, City Hall, city engr. Land rights not cleared and legal obstacles to be overcome.

Ia., Clinton—PARK IMPROVEMENTS—Bd. Park Comrs., City Hall, plans 50% completed hydraulic fill, driveways, grading in Riverview Park. $212,000. B. R. Anderson, City Hall, city engr.

Ia., Humboldt—SWIMMING POOL—City, City Hall, plans under way swimming pool, $30,000. Financing available. Lechner Engineering Co., Ames, engr. CD 8/24—ENR 9/7.

La., Jennings—AIRPORT—Jefferson Davis Parish Police Jury, Jennings, plans 10% completed Second Ward Airport work, incl. hangars, shop, etc., $75,000; 275 acre ground development, etc., $75,000. Bonds voted.

Mass., Danvers—FIREPROOFING, etc.—Commonwealth of Massachusetts, Dpt. Mental Health, 100 Nashua St., Boston, fireproofing and electric distr. sys., Ad Bldg. State Hospital, P-47, $70,000. M. A. Reidy, 101 Tremont St., Boston, consult. engr.

★**Mass., South Boston (sta. Boston)**—PIER—Commonwealth of Massachusetts, Dpt. P. Wks., 100 Nashua St., Boston, plans under way reconstructing Pier 2, $3,200,000. Financing not provided. J. R. Worcester & Co., 79 Milk St., Boston, consult. engr. CD 4/17—ENR 5/4.

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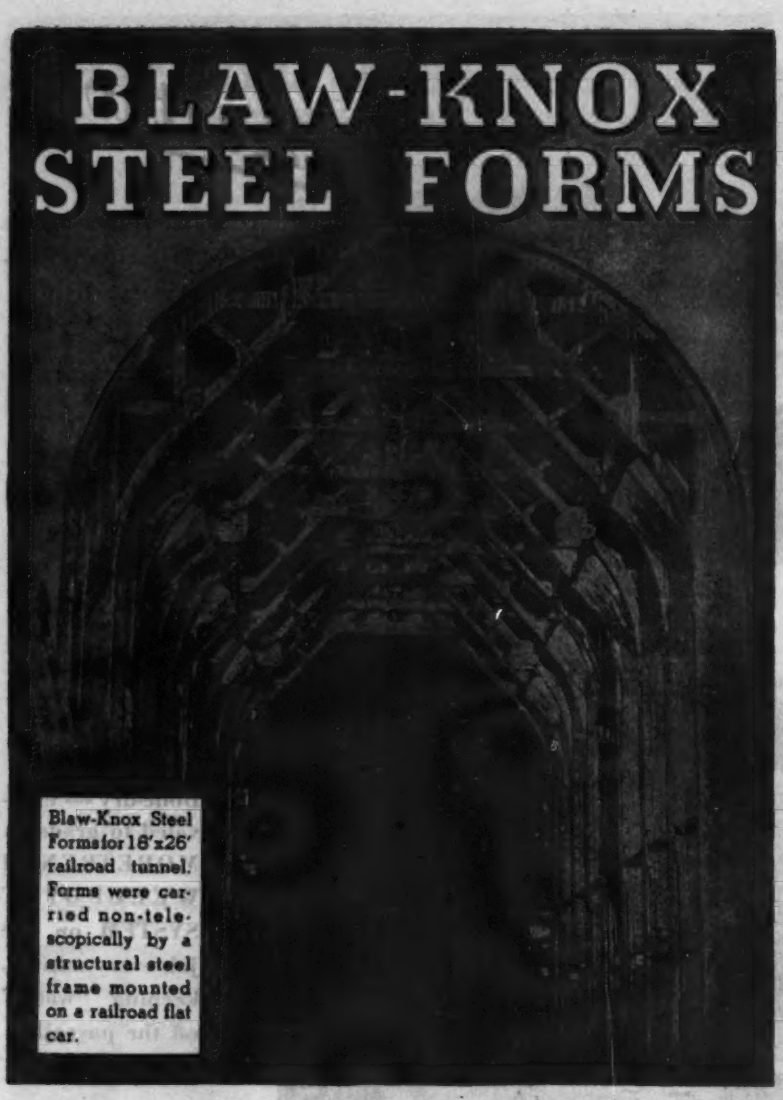

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POSTWAR PROJECTS (Cont'd.)

Mich., Bay City — ELECTRICAL DISTRIBUTION SYSTEM—City, City Hall, plans 10% completed imprv. electrical distr. sys. $170,000. Ayres, Lewis, Norrie & May, Ann Arbor, consult. engrs. R. McGillivray, City Hall, city planner.

Mich., Birmingham—PARK IMPROVEMENTS—City, City Hall, park imprvs. $30,000. Financing not provided. H. H. Corson, City Hall, city engr. CD 11/9.

Mich., Detroit — EXHIBIT — Zoological Park Comn., 13 Mile Rd., Royal Oak, plans 25% completed Australian Plain Exhibit, $50,500. G. R. Thompson, City Hall, city engr. CD 8/24—ENR 9/7.

Mich., Gladstone — PARK IMPROVEMENTS—City, 1100 Delta Ave., imprv. parks and playgrounds, $38,000. L. D. Goddard, Hancock, consult. engr. M. J. Henrickson, Gladstone, city engr.

Mich., Ironwood—LANDSCAPING—City, City Hall, plans 25% completed by M. Mattson, Ironwood, landscaping western approach to city cave area (iron mines), Mt. Zion summer and winter recreation development, incl. road widening and relocation, path, tree planting, observation tower and memorial shrine, swimming pool and bathhouse, bandshell, tennis courts, shuffle board courts, etc. $200,000. Financing not provided.

Mich., Ironwood—GAS DISTRIBUTION SYSTEM—City, City Hall, plans 20% completed change-over from water gas to propane air-gas, imprv. present gas distr. sys. $70,000. L. J. William, c/o Institute of Gas Technology, 3219 S. Dearborn St., Chicago, Ill., consult. engr.

Mich., Midland—PARKS—City, City Hall, imprv. parks. $25,000. M. V. Hunter, City Hall, city engr. CD 10/25—ENR 11/16.

Mich., Pontiac — AIRPORT IMPROVEMENTS—City, City Hall, airport imprvs. $300,000. Financing not provided. Giffels & Vallett, Inc., 1000 Marquette Bldg., Detroit, consult. engr. L. M. Wrenn, City Hall, city engr. H. Hoskins, airport mgr. CD 10/11—ENR 11/2.

Mich., Port Huron—PARKS, etc.—City, City Hall, imprv. parks, playfields, $50,000. Land rights not cleared and financing not provided. A. T. Carlisle, City Hall, acting city engr. CD 3/14—ENR 2/24.

New York—BATHHOUSE—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, plans by Smith & Stickney, 154 East Ave., Rochester, bathhouse at Fairhaven Beach State Park, Cayuga Co., CON.-2, for Finger Lake State Park Comn., Conservation Dpt. $55,000. CD 8/16—ENR 9/7.

New York—BEACH IMPROVEMENTS—State Dpt. P. Wks., State Office Bldg., Albany, Zone 1, plans under way beach imprvs. at Sunken Meadow Park, Suffolk Co., CON-31, for Long Island State Park Comn., Conservation Dpt. $50,000. Long Island State Park Comn., Babylon, engrs. CD 7/6—ENR 7/27.

New York—COMFORT STATION, etc.—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, plans under way by W. E. Haugaard, 350 5th Ave., New York, Zone 1, comfort station, shelter, etc., CON-19, at Hempstead State Park, $22,000; gasoline station, CON-25, at Jones Beach State Park, $35,000, both for Long Island State Park Comn., Conservation Dpt. CD 7/6—ENR 7/27.

New York—PARK DEVELOPMENT—Dpt. P. Wks., State Office Bldg., Albany, Zone 1, plans under way development Buckhorn Island Park, Niagara Co., CON-39, for Niagara Frontier State Park Comn., Conservation Dpt. $174,000. Fretts, Tallamy, Senior & Forrestel, 5483 Main St., Williamsville, Buffalo, engrs. CD 10/19—ENR 11/2.

N. Y., Chautauqua—FISH HATCHERY—N. Y. State Conservation Dpt., Fish & Game Div., Broadway Arcade Bldg., Albany, Zone 7, plans under way fish hatchery on 70 acre site at Prendergast Point, south of here, on Chautauqua Lake, $50,000. Fretts, Tallamy, Senoir & Forrestel, Main St., Williamsville, consult. engrs. CD 9/20—ENR 10/5, under New York.

O., Bellefontaine—AIRPORT—City, J. A. Sugrue, mayor, Municipal Bldg., approved bond issue, airport, $40,000. W. W. Wright, Municipal Bldg., city engr.

O., Delaware—AIRPORT—City, P. J. Foley, mayor, City Hall, plans under way airport. $40,000. Bond issue approved. C. Riddle, Municipal Bldg., dir. P. Serv.

★**O., Cincinnati**—PARKS—City, W. H. Kellogg, mgr., Municipal Bldg., approved bond issue imprv. municipal parks, $1,000,000, municipal playgrounds and recreation, $1,000,000. H. H. Kranz, Municipal Bldg., city engr.

O., North College Hill (br. Cincinnati)—SWIMMING POOL— City, J. J. Tomkins, mayor, City Hall, approved bond issue, municipal swimming pool, $70,000. J. Allen, City Bldg., city engr. CD 11/9.

O., Ravenna — AIRPORT — City, W. N. Miller, mayor, City Hall, approved bond issue airport, $50,000. K. M. Dussell, Municipal Bldg., city engr. CD 10/15/43—ENR 10/21/43.

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Ammonia Gelatin	Standard Gelatin	———	30 to 80	180 to 208	8500 to 24500*	Very Plastic
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POSTWAR PROJECTS (Cont'd.)

Ore., Hillsboro—SWIMMING POOL—City City Hall, bonds authorized swimming pool $50,000. John W. Cunningham & Associates Spalding Bldg., Portland, consult. engr.

★**Pa., Phila.**—PARK BLDGS., etc.—Fair mount Park Comn., City Hall, plans 10 completed bldgs., approaches, Proj. FP. $171,950; Proj. FP. 3, $157,000; Proj. FP. $150,000; Proj. FP. 5, $150,000, all at Phila Zoological Gardens.

Pa., Phila. — RADIO TRANSMITTER BLDG., etc.—Dpt. Pub. Safety, City Hall plans 35% completed by J. Roletter, city archt., radio transmitter bldg., SE. 5, $35, 000; plans 25% completed reconditioning police signal and fire telephone sys., $100,00 Electrical Bureau Staff, engrs.

★**Pa., Phila.**—SWIMMING POOLS, etc.— City, City Hall, plans 50% completed by J. Roletter, city archt., swimming pools Proj. WeR. 46-50, $32,610; Proj. WeR. 51-55 $25,000; Proj. WeR. 56-60, $25,000; Proj. WeR. 61-65, $25,000; plans 25% completed recreation centers, playgrounds, Proj. WeR 1-5, $350,000; Proj. WeR. 6-10, $325,000 Proj. WeR. 11-15, $330,000; Proj. WeR. 16-20, $330,000; Proj. WeR. 21-25, $340,000 Proj. WeR. 26-30, $350,000; Proj. WeR. 31-35, $340,000; Proj. WeR. 36-40, $460,110 Proj. WeR. 36-40, $408,000.

★**Pa., Phila.**—TRAFFIC ISLANDS, etc.— Bureau Traffic Engineering, City Hall plans 30% completed construction or installation traffic islands and signals, interconnection of signals, Projs. ST-1-2 $2,712,648. R. Mitchell, city traffic engr.

Tex., Beaumont—HANGARS, etc.—Jefferson Co., c/o Judge, plans 50% completed by Heartfield & Woodside, and C. L. Wignall, American National Bank Bldg., large hangars for airport, $150,000; administration bldg., $150,000. CD 10/30—ENR 11/2, under Unclassified.

Tex., Carrizo Springs—AIRPORT—Dimmit Co., c/o Judge, Carrizo Springs, plans under way airport, $75,000. Bonds voted.

★**Tex., Dallas**—AIRFIELD BLDG.—City City Hall, plans 25% completed by Thos. D. Broad, Burt Bldg., tripling size of Love Airfield administration bldg. $650,000. CD 10/27—ENR 11/16.

★**Tex., Houston**—PARKS—City, City Hall, plans 60% completed parks, recreation facilities, zoo, ground development, swimming pools, etc. $1,800,000. Bonds voted. CD 10/26.

★**Tex., Houston**—TUNNEL, etc.—Harris County Navigation Dist., Court House, plans 10% completed and bond election Dec. 19, tunnel on Ship Channel at Morgans Point and Pasadena, $1,250,000; rebuilding Dock 2, incl. double deck passenger terminal, $400,000; dock for deep draft boats, $450,000; imprvs. south-side wharf apron, fender, ry. track extens., etc., $150,000. Bonds Nov. 7 defeated. CD 10/11—ENR 11/2.

Tex., San Antonio—FIRE ALARM SYSTEM—City, City Hall, plans 10% completed fire alarm sys., throughout city, incl. municipal airport. $325,000. M. L. Diver, 1504 Main St., consult. engr.

★**W. Va., Huntington**—AIRPORT—City, City Hall, plans under way airport, $3,000,000. F. W. Whitney, City Hall, city engr.

Alta., Edmonton — BEAUTIFICATION SCHEME—Canadian National Rys., H. A. Dixon, ch. engr., 360 McGill St., Montreal, Que., beautification scheme around hotel and other railways bldgs. $50,000.

Alta., Edmonton — SUBWAY — Canadian National Rys., H. A. Dixon, ch. engr., 360 McGill St., Montreal, Que., subway, 95 St. $200,000.

Ont., London—ARENA—Western Fair Assn., W. D. Jackson, secy., 315 Richmond Bldg., plans by T. C. McBride, City Hall, and L. G. Bridgman, Royal Bank Bldg., 5,500 person seating capacity arena, 90 x 220 ft. ice surface, in Queens Park. $450,000. CD 5/9—ENR 5/23.

READY FOR BIDS

Alabama—RURAL ELECTRIC TRANSMISSION LINES—Cherokee Electric Corp., Centre, plans completed 60 mi. rural electric transmission lines, Cherokee Co. $50,000.

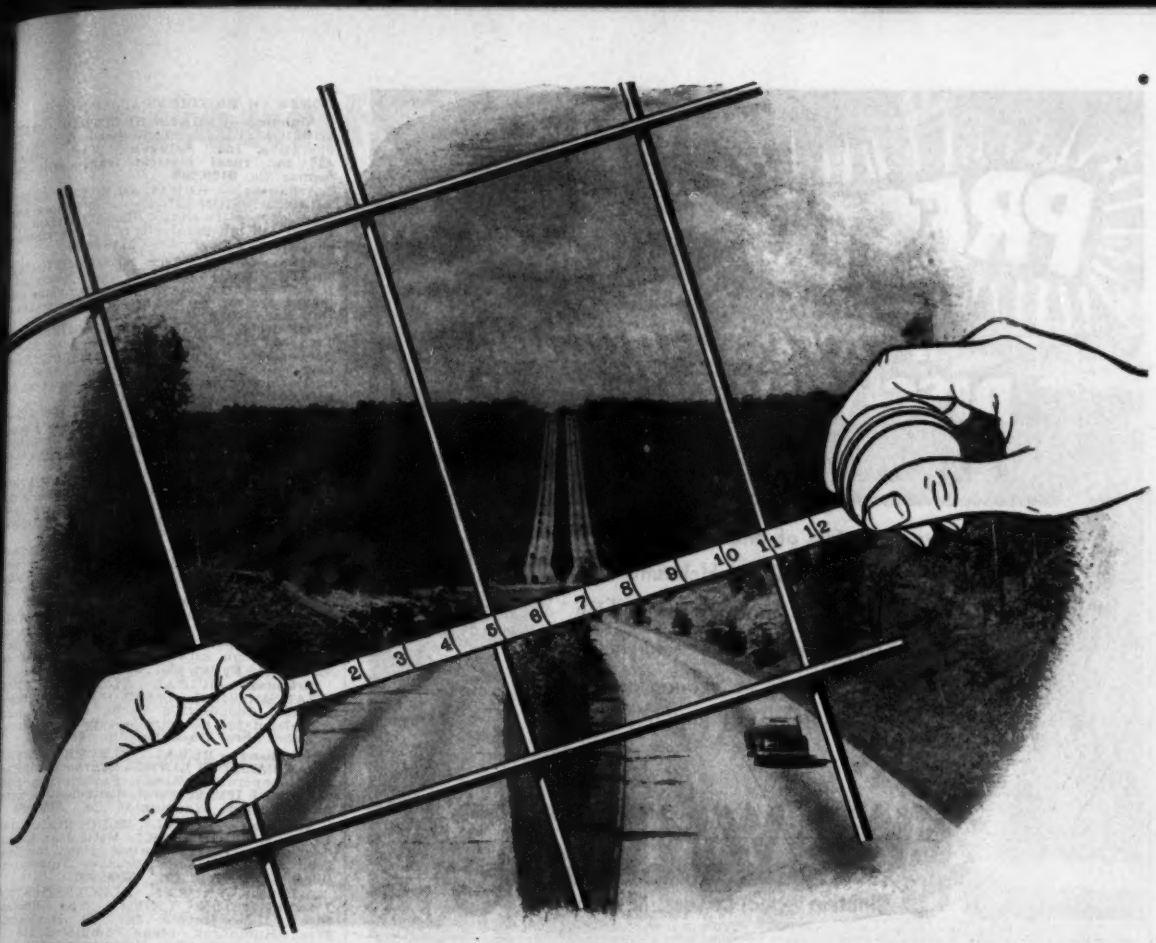
Alabama—RURAL ELECTRIC TRANSMISSION LINES—Dixie Electric Cooperative, Box 30, Union Springs, plans completed 137 mi. rural electric transmission lines, Bullock Co. $137,000.

Alabama—RURAL ELECTRIC LINES—Marshall-DeKalb Electric Cooperative, Boaz, plans completed 180 mi. rural electric lines, Marshall Co. $180,000.

Alabama—RURAL ELECTRIC TRANSMISSION LINES—Pea River Electric Cooperative, Clayton, plans completed 80 mi. rural electric transmission lines, Barbour Co. $80,000.

Alabama—RURAL ELECTRIC TRANSMISSION LINES—Sand Mountain Electric Cooperative, Box 149, Fort Payne, plans completed 75 mi. rural electric transmission lines, DeKalb Co. $75,000.

Alabama — RURAL ELECTRIC LINES — South Alabama Electric Corp., Troy, plans completed 60 mi. rural electric lines, Pike Co. $60,000.



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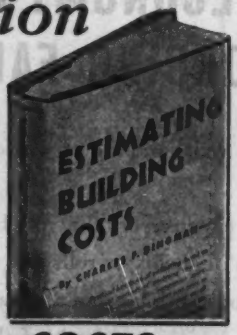

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ESTIMATING BUILDING COSTS tells how to make an estimate on a wood, brick, or concrete building construction, and covers every operation from excavating to roofing and waterproofing —with valuable material on such important details as fireproof construction, shingling, steel sash, or cement gun work. Included also are a number of useful data tables, but its primary purpose is to give the step-by-step methods that will train the reader to become a thoroughly competent estimator. This book helps you to make sure that no element of the work is overlooked, and explains the special factors to watch in dealing with each type of work.

While essentially a book of methods, ESTIMATING BUILDING COSTS contains 227 data tables and other useful reference features for the estimator, such as a reminder list of job elements, and a number of practical mathematical formulas.

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POSTWAR PROJECTS (Cont'd.)

Alabama—RURAL ELECTRIC TRANSMISSION LINES—Tombigbee Electric Cooperative, Inc., Sulligent, plans completed 420 mi. rural electric transmission lines, Lamar Co. **$420,000.**

Arkansas — RURAL ELECTRIFICATION TRANSMISSION LINES—C & L Rural Electric Cooperative Corp., Star City, plans completed 146 mi. rural electrification transmission lines, Lincoln Co. **$146,000.**

Arkansas — RURAL ELECTRIFICATION TRANSMISSION LINES—Clay County Electric Cooperative Corp., Corning, plans completed 114 mi. rural electrification transmission lines, Clay Co. **$114,000.**

Arkansas — RURAL ELECTRIFICATION TRANSMISSION LINES—Craighead Electric Cooperative Corp., 508 S. Main St., Jonesboro, plans completed 300 mi. rural electrification transmission lines, Craighead Co. **$300,000.**

Arkansas — RURAL ELECTRIFICATION TRANSMISSION LINES — Farmers Electric Cooperative Corp., Newport, plans completed 70 mi. rural electrification transmission lines, Jackson Co. **$70,000.**

Arkansas — RURAL ELECTRIFICATION TRANSMISSION LINES—First Electric Cooperative Corp., Jacksonville, plans completed 80 mi. rural electrification transmission lines, Pulaski Co. **$80,000.**

Arkansas — RURAL ELECTRIFICATION TRANSMISSION LINES—Mississippi County Electric Cooperative, Inc., Blytheville, plans completed 277 mi. rural electrification transmission lines, Mississippi Co. **$277,000.**

Arkansas — RURAL ELECTRIFICATION TRANSMISSION LINES — North Arkansas Electric Cooperative, Inc., Salem, plans completed 68 mi. rural electrification transmission lines, Fulton Co. **$68,000.**

Arkansas — RURAL ELECTRIFICATION TRANSMISSION LINES—Ouachita Rural Electric Cooperative Corp., Camden, plans completed 205 mi. rural electrification transmission lines, Ouachita Co. **$205,000.**

Arkansas — RURAL ELECTRIFICATION TRANSMISSION LINES—Ozarks Rural Electric Cooperative Assn., Fayetteville, plans completed 108 mi. rural electrification transmission lines, Washington Co. **$108,000.**

Arkansas — RURAL ELECTRIFICATION TRANSMISSION LINES—Petit Jean Electric Cooperative Corp., Clinton, plans completed 260 mi. rural electrification transmission lines, Van Buren Co. **$260,000.**

Arkansas — RURAL ELECTRIFICATION TRANSMISSION LINES — The Riceland Electric Cooperative, Inc., H. H. Harvill, pres., Humphrey, plans completed 226 mi. rural electrification transmission lines, Arkansas Co. **$226,000.**

Arkansas — RURAL ELECTRIFICATION TRANSMISSION LINES—Woodruff Electric Cooperative Corp., Augusta, plans completed 131 mi. rural electrification transmission lines, Woodruff Co. **$131,000.**

California—RURAL ELECTRIFICATION TRANSMISSION LINES — Surprise Valley Electrification Corp., Alturas, plans completed 60 mi. rural electrification transmission lines, Modoc Co. **$60,000.**

Colorado — RURAL ELECTRIFICATION TRANSMISSION LINES—La Plata Electric Assn., Inc., P. O. Box 180, Durango, plans completed 67 mi. rural electrification transmission lines, La Plata Co. **$67,000.**

Colorado — RURAL ELECTRIFICATION TRANSMISSION LINES — Mountain View Electric Assn., Inc., Limon, plans completed 350 mi. rural electrification transmission lines, Lincoln Co. **$350,000.**

Colorado — RURAL ELECTRIFICATION TRANSMISSION LINES—San Luis Valley Rural Electric Cooperative, Inc., Monte Vista, plans completed 270 mi. rural electrification transmission lines, Rio Grande Co. **$270,000.**

Colorado — RURAL ELECTRIFICATION TRANSMISSION LINES—San Miguel Power Assn., Inc., Nucla, plans completed 75 mi. rural electrification transmission lines, Montrose Co. **$75,000.**

Georgia — ELECTRIC TRANSMISSION LINES — Amicalola Electric Membership Corp., Jasper, plans completed 176 mi. electric transmission lines, Pickens Co. **$176,000.**

Georgia—RURAL ELECTRIC TRANSMISSION LINES—Flint Electric Membership Corp., Reynolds, plans completed 93 mi. rural electric transmission lines, Taylor Co. **$93,000.**

Georgia—RURAL ELECTRIC TRANSMISSION LINES—Grady County Electric Membership Corp., Cairo, plans completed 86 mi. rural electric transmission lines, Grady Co. **$80,000.**

Georgia—RURAL ELECTRIC TRANSMISSION LINE—Jefferson County Electric Membership Corp., Louisville, plans completed 222 mi. rural electric transmission line, Jefferon Co. **$232,000.**

Georgia—RURAL ELECTRIC TRANSMISSION LINES—Middle Georgia Electric Membership Corp., Vienna, plans completed 60 mi. rural electric transmission lines, Dooly Co. **$50,000.**

Georgia—RURAL ELECTRIC TRANSMISSION LINE—Oconee Electric Membership Corp., Dudley, plans completed 218 mi. rural electric transmission line, Laurens Co. **$218,000.**

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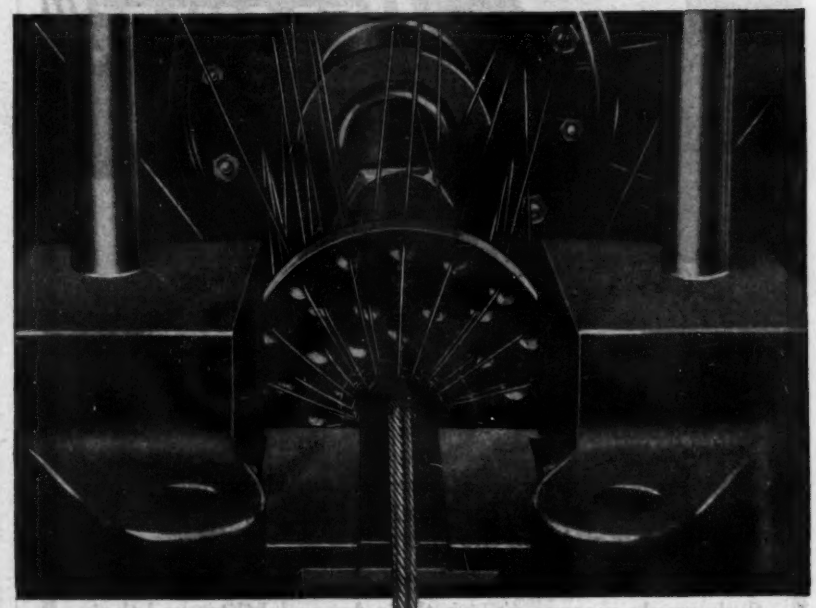

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POSTWAR PROJECTS (Cont'd.)

Georgia—RURAL ELECTRIC TRANSMISSION LINE—Walton Electric Membership Corp., Monroe, plans completed 109 mi. rural electric transmission line, Walton Co. $100,000.

Idaho — RURAL ELECTRIFICATION TRANSMISSION LINES—Clearwater Valley Light & Power Assoc., Inc., Lewiston, plans completed 131 mi. rural electrification transmission lines, Nez Perce Co. $131,000.

Idaho — RURAL ELECTRIFICATION TRANSMISSION LINES—Fall River Rural Electric Cooperative, Inc., Ashton, plans completed 76 mi. rural electrification transmission lines, Fremont Co. $76,000.

Idaho — RURAL ELECTRIFICATION TRANSMISSION LINES — Idaho County Light & Power Cooperative Assoc., Inc., Grangeville, plans completed 44 mi. rural electrification transmission lines, Idaho Co. $44,000.

Idaho — RURAL ELECTRIFICATION TRANSMISSION LINES—Long Valley Power Cooperative, Inc., Donnelly, plans completed 93 mi. rural electrification transmission lines, Valley Co. $93,000.

Idaho — RURAL ELECTRIFICATION TRANSMISSION LINES—Lost River Electric Cooperative, Inc., Mackay, plans completed 70 mi. rural electrification transmission lines, Custer Co. $70,000.

Idaho — RURAL ELECTRIFICATION TRANSMISSION LINES—Northern Idaho Rural Electrification Rehabilitation Assoc. Inc., Sand Point, plans completed 80 mi. rural electrification transmission lines, Bonner Co. $80,000.

Kansas — RURAL ELECTRIFICATION TRANSMISSION LINES — The Central Kansas Electric Cooperative Assoc., Inc. Great Bend, plans completed 128 mi. rural electrification transmission lines, Barton Co. $128,000.

Kansas — RURAL ELECTRIFICATION TRANSMISSION LINES—The Coffee County Rural Electric Cooperative Assoc., Inc., Burlington, plans completed 142 mi. rural electrification transmission lines, Coffee Co. $142,000.

Kansas — RURAL ELECTRIFICATION TRANSMISSION LINES—The Leavenworth Jefferson Electric Cooperative Co., Inc., Leavenworth, plans completed 281 mi. rural electrification transmission lines, Leavenworth Co. $281,000.

Kansas — RURAL ELECTRIFICATION TRANSMISSION LINES—The Sugar Valley Electric Cooperative, Assn., Inc., Mound City, plans completed 177 mi. rural electrification transmission lines, Linn Co. $177,000.

Kentucky—RURAL ELECTRIC TRANSMISSION LINES—Inter-County Rural Electric Cooperative Corp., Danville, plans completed 65 mi. rural electric transmission lines, Boyle Co. $65,000.

Kentucky—RURAL ELECTRIC TRANSMISSION LINE—Jackson Purchase Rural Electric Cooperative Corp., Paducah, plans completed 130 mi. rural electric transmission line, McCracken Co. $130,000.

Kentucky—RURAL ELECTRIC TRANSMISSION LINES—Licking Valley Rural Electric Cooperative Corp., Liberty, plans completed 225 mi. rural electric transmission lines, Casey Co. $225,000.

Kentucky—RURAL ELECTRIC TRANSMISSION LINES—Owen County Rural Electric Cooperative Corp., Owenton, plans completed 50 mi. rural electric transmission lines, Owen Co. $50,000.

Kentucky—RURAL ELECTRIC TRANSMISSION LINES—Pennyrile Rural Electric Cooperative Corp., P. O. Box 38 Hopkinsville, plans completed 170 mi. rural electric transmission lines, Christian Co. $170,000.

Kentucky—RURAL ELECTRIC TRANSMISSION LINES—Salt River Rural Electric Cooperative Corp., 115 W. Stephen Foster Ave., Bardstown, plans completed 70 mi. rural electric transmission lines, Nelson Co. $70,000.

Kentucky—RURAL ELECTRIC TRANSMISSION LINES—South Kentucky Rural Electric Cooperative, Somerset, plans completed 60 mi. rural electric transmission lines, Pulaski Co. $60,000.

Louisiana—RURAL ELECTRIFICATION TRANSMISSION LINES—South Louisiana Electric Cooperative Assoc., Inc., Houma, plans completed 50 mi. rural electrification transmission lines, Terrebonne Co. $50,000.

Louisiana — RURAL ELECTRIFICATION TRANSMISSION LINES—Southwest Louisiana Electric Membership Corp., 203 N. College Ave., Lafayette, plans completed 137 mi. rural electrification transmission lines, Lafayette Co. $137,000.

Louisiana—RURAL ELECTRIFICATION TRANSMISSION LINES—Valley Electric Membership Corp., Natchitoches, plans completed 146 mi. rural electrification transmission lines, Natchitoches Co. $146,000.

Louisiana—RURAL ELECTRIFICATION TRANSMISSION LINES—Washington-St. Tammany Electric Membership Corp., Franklinton, plans completed 184 mi. rural electrification transmission lines, Washington Co. $184,000.

Minnesota—RURAL ELECTRIFICATION TRANSMISSION LINES — Meeker Cooperative Light & Power Assoc., Litchfield, plans completed 150 mi. rural electrification transmission lines, Meeker Co. $150,000.

POSTWAR PROJECTS (Cont'd.)

Minnesota—RURAL ELECTRIFICATION TRANSMISSION LINES—Minnesota Valley Cooperative Light & Power Assn., Montevideo, plans completed 100 mi. rural electrification transmission lines, Chippewa Co. $100,000.

Minnesota—RURAL ELECTRIFICATION TRANSMISSION LINES—Nobles Cooperative Electric Co., Worthington, plans completed 377 mi. rural electrification transmission lines, Nobles Co. $277,000.

Minnesota—RURAL ELECTRIFICATION TRANSMISSION LINES—Northern Electric Cooperative Assn., Box 16?, Virginia, plans completed 320 mi. rural electrification transmission lines, St. Louis Co. $320,000.

Minnesota—RURAL ELECTRIFICATION TRANSMISSION LINES—P.K.M. Electric Cooperative, Inc., Warren, plans completed 170 mi. rural electrification transmission lines, Marshall Co. $170,000.

Minnesota—RURAL ELECTRIFICATION TRANSMISSION LINES—Red Lake Electric Cooperative, Inc., Red Lake Falls, plans completed 60 mi. rural electrification transmission lines, Red Lake Co. $60,000.

Minnesota—RURAL ELECTRIFICATION TRANSMISSION LINES — Renville-Sibley Cooperative Power Assoc., Fairfax, plans completed 136 mi. rural electrification transmission lines, Renville Co. $136,000.

Minnesota—RURAL ELECTRIFICATION TRANSMISSION LINES — Todd-Wadena Power & Light Cooperative Assn., Wadena, plans completed 70 mi. rural electrification transmission lines, Wadena Co. $70,000.

Mississippi—RURAL ELECTRIC TRANSMISSION LINES—Coast Electric Power Assn., 154 Main St., Bay St. Louis, plans completed 50 mi. rural electric transmission lines, Hancock Co. $50,000.

Mississippi—RURAL ELECTRIC LINES—Magnolia Electric Power Assn., Box 979, McComb, plans completed 80 mi. rural electric lines, Pike Co. $80,000.

Mississippi—RURAL ELECTRIC TRANSMISSION LINES—Northeast Mississippi Electric Power Assn., Oxford, plans completed 50 mi. rural electric transmission lines, Lafayette Co. $50,000.

Missouri—RURAL ELECTRIFICATION TRANSMISSION LINES—Laclede Electric Cooperative, Lebanon, plans completed 167 mi. rural electrification transmission lines, Laclede Co. $167,000.

Missouri—RURAL ELECTRIFICATION TRANSMISSION LINES—Macon Electric Cooperative, Macon, plans completed 170 mi. rural electrification transmission lines, Macon Co. $170,000.

Missouri—RURAL ELECTRIFICATION TRANSMISSION LINES—New-Mac Electric Cooperative, Inc., Neosho, plans completed 140 mi. rural electrification transmission lines, Newton Co. $140,000.

Missouri—RURAL ELECTRIFICATION TRANSMISSION LINES — Nodaway-Worth Electric Cooperative, Inc., Maryville, plans completed 200 mi. rural electrification transmission lines, Nodaway Co. $200,000.

Missouri — RURAL ELECTRIFICATION TRANSMISSION LINES—Osage Valley Electric Cooperative Assoc., P. O. Box 151, Butler, plans completed 74 mi. rural electrification transmission lines, Bates Co. $74,000.

Missouri—RURAL ELECTRIFICATION TRANSMISSION LINES—Ozark Electric Cooperative, Mt. Vernon, plans completed 119 mi. rural electrification transmission lines, Lawrence Co. $119,000.

Missouri—RURAL ELECTRIFICATION TRANSMISSION LINES—Sac-Osage Electric Cooperative, Inc., P. O. Box 111, El Dorado Springs, plans completed 63 mi. rural electrification transmission lines, Cedar Co. $63,000.

Missouri—RURAL ELECTRIFICATION TRANSMISSION LINES—Scott-New Madrid-Mississippi Cooperative Assoc., Sikeston, plans completed 115 mi. rural electrification transmission lines, Scott Co. $115,000.

Missouri—RURAL ELECTRIFICATION TRANSMISSION LINES—Southwest Electric Cooperative, Bolivar, plans completed 225 mi. rural electrification transmission lines, Polk Co. $225,000.

Missouri—RURAL ELECTRIFICATION TRANSMISSION LINES—Three Rivers Electric Cooperative, Inc., Linn, plans completed 206 mi. rural electrification transmission lines, Osage Co. $206,000.

Montana — RURAL ELECTRIFICATION TRANSMISSION LINES—Park Electric Cooperative, Inc., Livingston, plans completed 114 mi. rural electrification transmission lines, Park Co. $114,000.

Montana — RURAL ELECTRIFICATION TRANSMISSION LINES—Vigilante Electric Cooperative, Inc., Dillon, plans completed 220 mi. rural electrification transmission lines, Beaverhead Co. $220,000.

New York—DAM, etc.—Dpt. P. Wks., State Office Bldg., Albany, plans completed dam and lake at Stony Brook State Park, Steuben Co., CON.-9, for Finger Lake State Park Comn., Conservation Dpt. $45,291. Barker & Wheeler, 36 State St., Albany, consult. engrs. CD 6/19—ENR 6/29.

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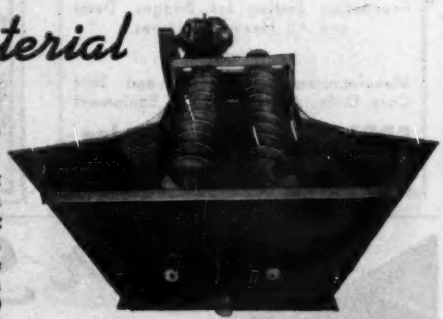

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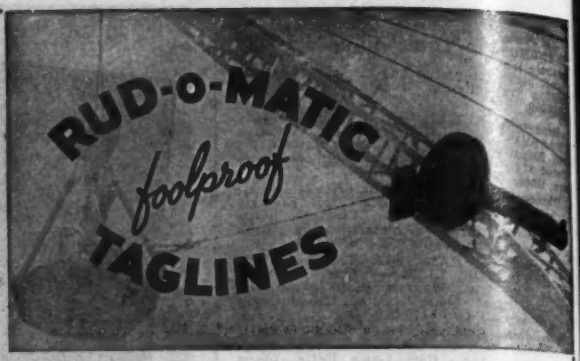

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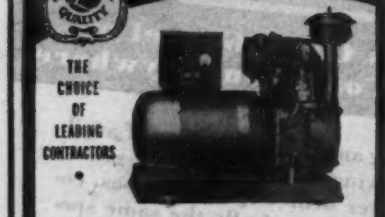

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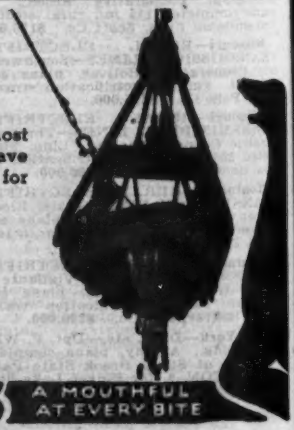

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POSTWAR PROJECTS (Cont'd.)

Oklahoma — RURAL ELECTRIFICATION TRANSMISSION LINES—Choctaw Electric Cooperative, Inc., Hugo, plans completed 66 mi. rural electrification transmission lines, Choctaw Co. $66,000.

Oklahoma — RURAL ELECTRIFICATION TRANSMISSION LINES—Indian Electric Cooperative, Inc., 116 S. Bway., Cleveland, plans completed 212 mi. rural electrification transmission lines, Pawnee Co. $212,000.

Oklahoma — RURAL ELECTRIFICATION TRANSMISSION LINES—Northwestern Electric Cooperative, Inc., Woodward, plans completed 235 mi. rural electrification transmission lines, Woodward Co. $235,000.

Oregon — RURAL ELECTRIFICATION TRANSMISSION LINES — Benton-Lincoln Electric Cooperative, Inc., Corvallis, plans completed 300 mi. rural electrification transmission lines, Benton Co. $300,000.

Oregon — RURAL ELECTRIFICATION TRANSMISSION LINES — Blachly-Lane County Cooperative Electric Assoc., Blachly, plans completed 114 mi. rural electrification transmission lines, Lane Co. $114,000.

Oregon — RURAL ELECTRIFICATION TRANSMISSION LINES — Douglas Electric Cooperative, Roseburg, plans completed 121 mi. rural electrification transmission lines, Douglas Co. $121,000.

Oregon — RURAL ELECTRIFICATION TRANSMISSION LINES—Lane County Electric Cooperative, Inc., Eugene, plans completed 300 mi. rural electrification transmission lines, Lane Co. $300,000.

Texas — RURAL ELECTRIFICATION TRANSMISSION LINES — Baylor Electric Co., Seymour, plans completed 175 mi. rural electrification transmission lines, Baylor Co. $175,000.

Texas — RURAL ELECTRIFICATION TRANSMISSION LINES—Cap Rock Electric Cooperative, Stanton, plans completed 50 mi. rural electrification transmission lines, Martin Co. $50,000.

Texas — RURAL ELECTRIFICATION TRANSMISSION LINES — Floyd County Electric Cooperative, Floydada, plans completed 200 mi. rural electrification transmission lines, Floyd Co. $200,000.

Texas — RURAL ELECTRIFICATION TRANSMISSION LINES——Greenbelt Electric Cooperative, Wellington, plans completed 160 mi. rural electrification transmission lines, Collingsworth Co. $160,000.

Texas — RURAL ELECTRIFICATION TRANSMISSION LINES—Hall County Electric Cooperative, Memphis, plans completed 150 mi. rural electrification transmission lines, Hall Co. $150,000.

Texas — RURAL ELECTRIFICATION TRANSMISSION LINES—Hill County Electric Cooperative, Itaska, plans completed 50 mi. rural electrification transmission lines, Hill Co. $50,000.

Texas — RURAL ELECTRIFICATION TRANSMISSION LINES—Hunt Co. Electric Cooperative, Inc., Greenville, plans completed 50 mi. rural electrification transmission lines, Hunt Co. $50,000.

Texas — RURAL ELECTRIFICATION TRANSMISSION LINES — Kaufman Co., Electric Cooperative, Kaufman, plans completed 100 mi. rural electrification transmission lines, Kaufman Co. $100,000.

Texas — RURAL ELECTRIFICATION TRANSMISSION LINES—Lamb County Electric Cooperative, Littlefield, plans completed 200 mi. rural electrification transmission lines, Lamb Co. $200,000.

Texas — RURAL ELECTRIFICATION TRANSMISSION LINES—Lyntogar Electric Cooperative, Tahoka, plans completed 35 mi. rural electrification transmission lines, Lynn Co. $35,000.

Texas — RURAL ELECTRIFICATION TRANSMISSION LINES—South Plains Electric Cooperative, Lubbock, plans completed 125 mi. rural electrification transmission lines, Lubbock Co. $125,000.

Tex., Harlingen—DOCKS—Arroyo Colorado Navigation Dist., C. H. Purdy, chn., Rio Grand Bldg., plans completed terminal docks. $100,000. CD 6/23—ENR 6/29, under Public.

Tex., Houston—AIRPORT RUNWAYS, etc.—City, City Hall, plans completed, runways, hangars, etc. for airport. Over $325,000. Bonds voted. CD 10/26.

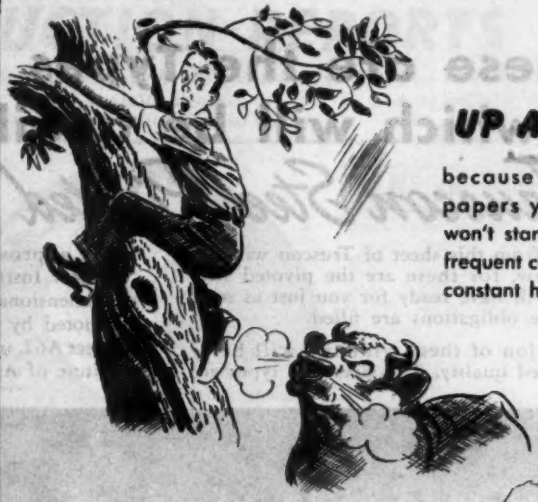
Washington — RURAL ELECTRIFICATION TRANSMISSION LINES—Big Bend Electric Cooperative, Inc., Ritzville, plans completed 185 mi. rural electrification transmission lines, Adams Co. $185,000.

Washington — RURAL ELECTRIFICATION TRANSMISSION LINES — Public Utility Distr. 1 of Clallam Co., Forks, plans completed 53 mi. rural electrification transmission lines, Clallam Co. $53,000.

Washington—RURAL ELECTRIFICATION TRANSMISSION LINES—Orcas Power & Light Co., Eastsound, plans completed 158 mi. rural electrification transmission lines, San Juan Co. $158,000.

Washington—RURAL ELECTRIFICATION TRANSMISSION LINES—Pend Oreille Electric Cooperative, Inc., Newport, plans completed 106 mi. rural electrification transmission lines, Pend Oreille Co. $106,000.

Washington—RURAL ELECTRIFICATION TRANSMISSION LINES—Public Utility Dist. 1 of Klickitat Co., White Salmon, plans completed 289 mi. rural electrification transmission lines, Klickitat Co. $289,000.



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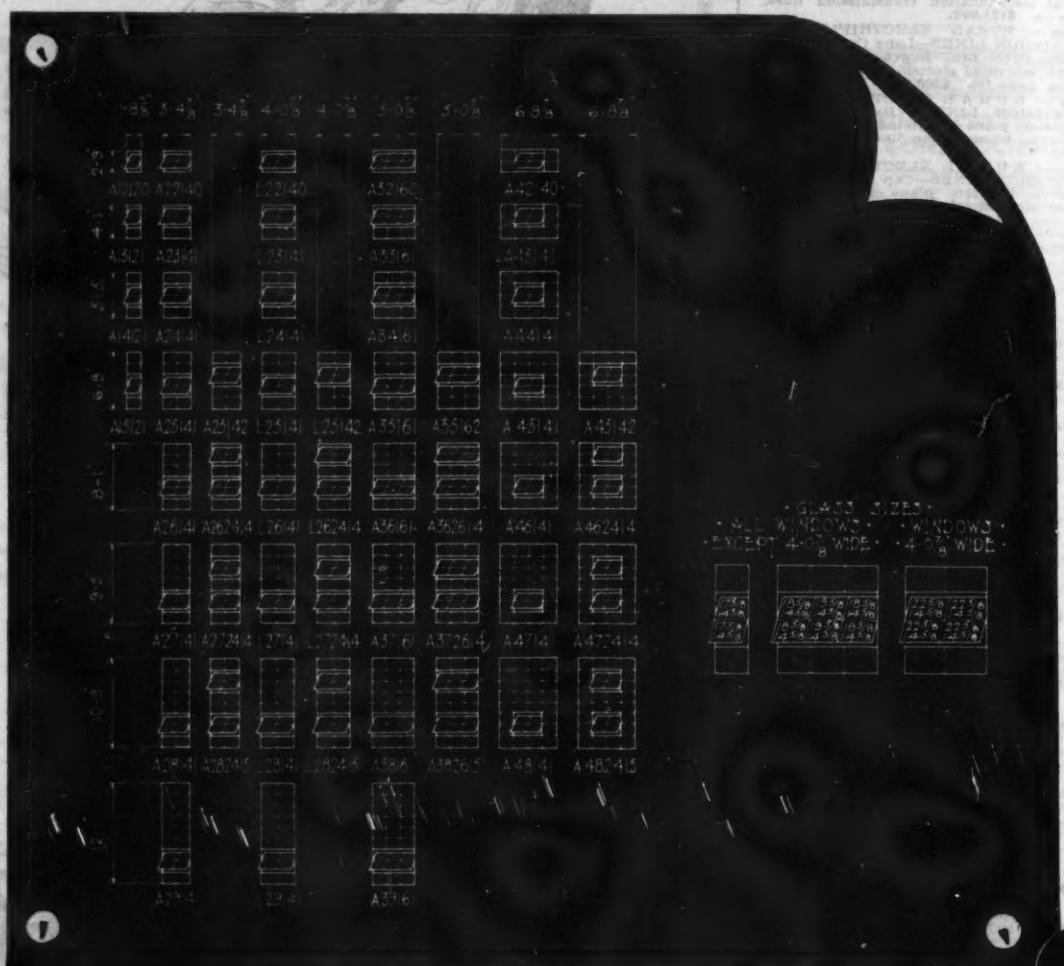

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AIA FILE NO. 16E

CONSTRUCTION REPORTS

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 18, N. Y.
ELSIE EAVES, Manager *SCOTT McLEOD, Statistics* *J. A. MAHONEY, Reports*
(Daily service also available—Write for details)

WATER SUPPLY

PROPOSED WORK

Mass., Billerica—Town Bd. P. Wks., Town Hall, addnl. 1 m.g. water storage. $50,000. T. R. Camp, 6 Beacon St., Boston, engrs.

Me., Waterville—Trustees Kennebec Water Dist., A. B. Thompson, supt., Waterville, rejected bids Nov. 14, 26,400 lin. ft. 16 in. watermain to North Vassalboro. Will probably readvertise. Metcalf & Eddy, 1300 Statler Bldg., Boston, Mass., engrs. CD 11/21—ENR 11/30, under LB.

Mo., Senath—City, V. A. O'Connor, mayor, City Hall, voted $21,500 bonds deep well, other WW sys. imprvs. $25,000. Russell & Axon, 4903 Delmar Blvd., St. Louis, Zone 8, engrs. CD 10/23—ENR 10/26.

†**N. Y., West Point**—U. S. Eng., 120 Wall St., New York, Zone 5, bids soon filtration plant addn. $195,000.

O., Bryan—Bd. P. Affairs, Bryan, water tower. $45,000.

O., Canton—City, drilling 12 in. well, two 6 in. and twelve 4 in. wells in field to determine probable capacity of source for city water from underground sources. $25,000 or more. J. Shisler, city engr.

O., Canton—Comrs. Stark Co., Court House, bids soon WW, Genoa Sect. 1, Edurban Sanitary Sewer Dist., west of here. $155,358. L. M. Zerbe, Court House, co. engr. CD 11/1—ENR 11/16.

O., Toledo—Lucas Co., laying 2,800 ft. 12 in. water line and 24 in. sanitary lines, Glendale Ave. from Detroit Ave. to Plaskon Research Laboratory of Libbey-Owens-Ford Glass Co. at Terminal R. R. $30,000. S. C. McKee, Court House, engr.

Tex., Bangs—E. A. Medcalf, mayor, City Hall, exten. water lines. $35,000. Applied for PWA funds. Freese & Nichols, Capps Bldg., Fort Worth, engrs. CD 8/31—ENR 6/8.

Tex., San Antonio—City Water Bd., 106 W. Market St., laying over 20,000 lin. ft. 2- to 6-in. c.i. mains and connections, Davis Heights locations. $25,000.

★**Va., Roanoke**—City, developing Carvin's Cove for addnl. water supply. $1,585,000.

N. B., St. Andrews—Canadian Pacific Ry. Co., J. E. Armstrong, ch. engr., Windsor Sta., Montreal, Que., water reservoir reconstruction. $21,000.

Newfoundland, Windsor — Municipality, WW sys. $30,000.

Ont., Dutton—Village, W. M. Blain, clk., installing water sys., water to be supplied from West Lorne pump. plant at Eagle, 5 mi. west of here. $133,000. CD 10/5—ENR 10/12.

Ont., Niagara Falls—Niagara Twp., J. Sterling, clk., R.R. 4, St. Catherines, WW sys. $30,000. R. B. Erwin, 600 Erie Ave., engr. CD 9/20—ENR 9/28.

Que., Cowansville—Town, E. Boisvert, mayor, A. C. Tanner, secy., water supply sys. $250,000. Crepeau & Cote, 45 Wellington St. W., Sherbrooke, engrs.

Que., Joliette—Municipality, watermains. $15,000. E. H. Lippe, Town Hall, engr.

Que., St. Benoit—Municipality, watermains. $20,000.

Que., St. Fulgence—Municipality, Emile Coutiere, secy., St. Fulgence, water sys. $20,000.

Que., St. Sauveur des Monts—Municipality, A. Belanger, clk., St. Sauveur des Monts, WW imprvs. $15,000. A. Roy, 4396 St. Hubert St., Montreal, engr. CD 9/14—ENR 9/23.

BIDS ASKED

Bids Asked December 19

Ill., Stateville—Illinois Div. Architecture & Engineering Armory Bldg., Springfield, replacement turbine well pumps, Illinois State Penitentiary, Stateville Branch. Over $35,000. C. Herrick Hammond, Armory Bldg., Springfield, state archt.

Bids Asked December 26

N. Y., Long Beach—M. J. Fleischman, city clk., City Hall, removing deep well turbine pumps from Well 4 at Main Water Works Plant and Well 7, at Indiana Ave. Plant, clean, repair and paint same, clean well screen, etc.; adv. ENR 12/14.

LOW BIDDERS

Va., Richmond—Dpt. P. Utilities, J. R. A. Jobson, dir., 217 Governor St., elevated storage water tank, from Chicago Bridge & Iron Co., 1700 Walnut St., Phila., Pa., $191,800. Newson & Aldrich, 500 5 Ave., New York, N. Y., engrs.

Symbols and Abbreviations Include:

† Federal Government
★ Project of $500,000 or over
ENR Engineering News-Record
CD Engineering New-Record Construction Daily

Projects—By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger; water supply, earthwork, waterworks, $15,000; other public works, $25,000; industrial buildings, $40,000; other buildings, $150,000.

Classes of Construction

(Name in order of Listing)

Water Supply
Sewers, Waste Disposal
Bridges
Streets & Roads
Earthwork, Waterways
Latin America
Public Buildings
Commercial Buildings
Industrial Buildings
Unclassified

Stages Reported

PROPOSED: (except Streets & Roads): BIDS ASKED (new announcements only. For full calendar, see also preceding issues of ENR);

LOW BIDDERS: On jobs below $500,000 value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.

CONTRACTS AWARDED: Except awards to low bidders previously reported in low bidder stage.

Dates shown are of issue in which last previous report was published.

CONTRACTS AWARDED

Ala., Phenix City — Town, H. D. Cobb, mayor, City Hall, WW imprvs., to Schley-Gordy, Contr., 1510 Hilton Ave., Columbus, Ga., $32,500. Bids 11/17. CD 11/9.

†**Fla., St. Petersburg**—U. S. Eng., Post Office Bldg., Savanah, Ga., water and sewage facilities, Don-Ce-Sar Hospital, Contr. W-09-133-eng-487, to C. J. Keys, First Federal Bldg., St. Petersburg. $24,518.

Wis., Greenfield—Broson Manor Sanitary Dist., 2846 S. Conger St., West Allis, deep well, to Layne-Northwest Co., 719 N. 11 St., Milwaukee, Zone 3, $19,122. Bids 12/1. C. S. Whitney, 724 E. Mason St., Milwaukee, Zone 2, engr. Mead, Ward & Hunt, Co., 550 State St., Madison, assoc. engrs.

Ont., Wallaceburg—Town, completing WW, incl. bldg. to house high lift pump. sta., filters, settling tanks, mixing chambers, 75x75 ft. filtered water reservoir, and bldg at Inze channel to house all low lift pump, apparatus, to Sterling Const. Co., Ltd., 2492 Sandwich St. E., Windsor, about $85,-000. Bids 9/15. Gore & Storrie, 1130 Bay St., Toronto, engrs. CD 8/8.

SEWERS, WASTE DISPOSAL

PROPOSED WORK

Calif., Laguna Beach—South Coast County Water Dist., c/o A. J. Stead, city engr., City Hall, approved $285,000 bonds, bids early 1945, 32,000 lin. ft. 16 in. watermain and 2 m.g. gal. rein.-con. reservoir in Laguna Beach. CD 6/1—ENR 6/8.

★**Calif., San Francisco**—City and San Francisco Co., City Hall, preliminary plans rein.-con. sewage disposal plant in North Point Dist. $7,500,000. Harrison Eddy, 1300 Statler Bldg., Boston, Mass., and C. C. Kennedy, 604 Market St., San Francisco, archts.

O., Canton—City, 8 in. c.i. sludge line from sewage disposal plant to sewer farm. $25,000. C. C. Hommon, city sanitary engr.

O., Toledo—Lucas Co., laying 30 in. storm sewer Glendale Ave. from Detroit Ave. to Plaskon Research Laboratory of Libbey-Owens-Ford Glass Co. at Terminal R. R. $34,000. B. Kesting, Court House, engr.

Pa., Berwick Borough—Berwick Borough, c/o Borough Clerk, incinerator plant. $80,000. Bond proceedings approved by State Secretary of Internal Affairs.

Pa., Easton — Dpt. Streets and Pub. Imprvts., City Hall, preparing plans sewage disposal plant. $300,000.

Que., St. Jeachim—Municipality, L. J. Macure, secy., sewers with discharge outlet to river. $25,000.

BIDS ASKED

Bids Asked December 20

Mo., Clayton (St. Louis, Zone 5, P. O.)—St. Louis County Court, W. E. Miller, clk., Court House, Clayton (St. Louis, Zone 5), storm sewer, vicinity of Bayless Ave. and Donald Pl. R. Jablonsky, Court House, Clayton, St. Louis, Zone 5, engr.

Bids Asked December 20

Mo., St. Johns-Overland (St. Louis 14, P. O.)—St. Johns-Overland Sanitary Sewer Dist., M. J. Mohan, pres. Bd. Trustees, Wright and Livingstone Aves., St. Louis County, sewage treatment plant, auxiliary appurtenances, etc. $21,460-$25,000. Plans deposit $10. E. A. Fulton, 3 S. Meramec Ave., Clayton, St. Louis, Zone 5, ch. engr.

Bids Asked December 20

†**Va., Blackstone**—Town, City Hall, 1 sewage pump. sta., 2 pumps, sewerage drainage area, collection lines, main sewers, house connections and c.i. discharge lines. $45,000. Plans deposit $10. R. Stuart Royer, Builders Exchange Bldg., Richmond, engr.-archt. CD 11/14—ENR 11/16.

Bids Asked December 21

N. J., Sea Bright—Borough, Borough Hall, brick sewage treatment plant addn. H. Herberg, 175 Liberty St., Long Branch, engr.

LOW BIDDERS

†**Va., Denbigh**—Bd. Supervs. Warwick Co., at office Dir. P. Wks., Hilton Village, Dec. 8, Contr. 2, 5,424 lin. ft. 12- to 42-in. sanitary pipe drains, necessary manholes, appurtenances, etc., Va. 44-398, from A. Stanley Mundy & Co., Inc., 52 Main St., Woodbridge, N. J., $88,368. FWA. CD 11/28—ENR 11/30.

Wis., Lake (P. O. Milwaukee)—Town, 4001 S. 6 St., Milwaukee, Zone 7, Dec. 5, sanitary sewer, from R. & W. Constr. Co., 2934 S. 53 St., West Allis, Zone 14, $27,927. E. Voelker, Town Hall, engr.

CONTRACTS AWARDED

Calif., Anaheim—City, City Hall, 13,750 lin. ft. 30 in. vitr. clay sanitary sewer, Proj. Calif. 4-657-N (non-federal), to T. L. Gogo, 10024 S. Figueroa St., Los Angeles. $116,460. Bids 11/28.

†**Ind., Crane**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., storm and sanitary sewers, sewage disposal plant for 4 warehouses, Naval Ammunition Depot, NOY 11352, to Weikel Constr. Co., 1150 Fairview Ave., Fort Wayne, Zone 8, $42,854.

†**Fla., Jacksonville**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., sewage for main station, Naval Air Station, NOY 10443, to Ivy H. Smith Constr. Co., P. O. Box 5098, Jacksonville, Zone 7, $261,807. CD 8/18—ENR 8/24.

†**Neb., Grand Island**—U. S. Eng., 1709 Jackson St., Omaha, addnl. outside utilities and sewage treatment plant, Army Airfield, Contr. W-25-066-Eng-651, to A. M. Anderson Constr. Co., Geneva, $71,566.

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BRIDGES

PROPOSED WORK

†Ore., Portland—Federal Works Agency, Spalding Bldg., overpass at Guild's Lake project. $54,639. B. S. Morrow, City Hall, engr.

Pa., Upper Moreland—Comrs. Upper Moreland Twp., C. M. Ely, secy., York and Easton Rds., Willow Grove, bridge, $50,000 or more. G. B. Mebus, 112 S. Easton Rd., Glenside, engr.

N. S., Antigonish—Municipality, H. R. Chisholm, clk., Antigonish, reconstructing 3 bridges. $45,000.

Ont., Lindsay—Municipality, W. R. Allely, clk., bridge over Scugog River. $30,000. J. T. Allan, 94 King St., archt.

Ont., Ottawa—Municipality, bridge, Fairmont Ave. $40,000.

BIDS ASKED

Bids Asked January 5

Kentucky—Dpt. Hys., Frankfort, cleaning, painting steel bridge over Middle Fork of Kentucky River, The Jackson-Booneville Rd., MP-13-67-4, Breathitt Co.; culvert for Pond Run Creek, at Raceland, Greenup-Ashland Rd., SP-45-31, Greenup Co.; grading, draining 0.417 mi. revision in alignment at Village of Washington, Maysville-Paris Rd., SP 81-175, Mason Co.

CONTRACTS AWARDED

Que., St. Timothee — Canadian Light & Power Co., Ltd., 107 W. Craig St., Montreal, bridge reconstruction, day labor. $25,000. CD 10/28/43.

STREETS AND ROADS

BIDS ASKED

Bids Asked December 30

Louisiana—State Hy. Dpt., D. Y. Smith, dir., Baton Rouge, shaping, roadway, gravel surfacing, drainage structures 11.5 mi. maneuver area roads, Group 1, Sect. 3, on State Route 322, S.P. 737-00-061, Contr. 2, Vernon Parish; shaping, gravel shoulders, drainage structures, bituminous surface treating 14.663 mi. maneuver area roads, Group 14, Sects. 1, 2, and 3, on State Route 21 S.P. 737-00-19, Group 14, Sects. 1, 2 and 3, Vernon and Rapids Parishes; 8 in. uniform concrete paving 26.6 mi. maneuver area roads, Group 16, Sects. 1, 2 and 3, State Route 20, S.P. 737-00-31, Natchitoches and Rapides Parishes.

LOW BIDDERS

California — State Div. Hys., 803 State Bldg., Los Angeles, Nov. 30, imprv. 1.6 mi. Orange Co., from Lewis Constr. Co., 214 S. Vermont Ave., Los Angeles, $76,305. G. T. McCoy, state hy. engr. CD 11/10—ENR 11/16.

California—State Div. Hys., Sacramento, Dec. 6, imprv. 0.9 mi. Alameda Co., from L. J. Immell, Box 65, Sta. A, Berkeley, $83,011. CD 11/17—ENR 11/23.

D. C., Wash. — District Comrs., District Bldg., Dec. 8, repairing 1,500 cu. yd. concrete roadways and alley pavements and 10,000 sq. yd. concrete sidewalks, from E. B. Donaldson & Bro., 12th and Brentwood Rd. N.E., $93,574 est. $75,000, 6,000 tons bituminous concrete mixture, from McGuire & Rolfe, 1 and O Sts. S.W., $34,200 est. $35,000. CD 12/4.

D. C., Wash.—District Comrs., District Bldg., Dec. 7, 2,500 tons asphaltic materials and about 12,000 cu. yd. concrete base pavement repairs, East Section, from McGuire & Rolfe, Inc., 1 and O Sts., S. E., $123,602; West Section, from Corson & Gruman Co., 33 and K Sts. N. W., $132,880. CD 12/4.

Michigan—State Hy. Dpt., Lansing, Nov. 29, 2.162 mi. 23 ft. aggregate surface and necessary grading and drainage access road to continental motors plant, DA-WI-61-41C-2, Muskegon Co., from Bridgeport Core Sand Co., 125 Davenport St., Saginaw, $67,544.

CONTRACTS AWARDED

Alabama — State Hy. Dpt., Montgomery, grading, concrete paving, etc. 0.785 mi. Tuscaloosa Co., to E. J. & W. L. Cobb Co., 803 Mobile Rd., Montgomery, $44,809; bridges, to C. L. Rhodes, Decatur, Ga., $53,306. Bids 10/10. CD 10/31—ENR 11/2.

†R. I., Quonset Point—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., paving 13,000 sq. yd., Naval Air Station, NOY 9507, to M. A. Gammino Constr. Co., 728 Valley St., Providence, $37,232. Bids 11/21.

Idaho—Comr. P. Wks., J. D. Wood, Boise, furnishing crushed gravel surfacing in stockpiles, adjacent to Hy. U.S. 95, Canyon and Payette Counties, to H. A. Gardner, Blackfoot, $30,250. Est. $43,000. Bids 12/1.

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EARTHWORK, WATERWAYS

PROPOSED WORK

†Idaho, Coeur d'Alene—Bureau Reclamation, Coeur d'Alene, preparing plans, pump. plant, canal and lateral sys. for Post Falls unit of Rathdrum Prairier reclamation project. $300,000.

†Wash., Wenatchee—Wenatchee Reclamation Dist., Wenatchee, replacing 1,400 ft. 60 in. creosoted wood stave pipe, and constructing spillway. $80,000.

B. C., Victoria—Dominion Govt., Ottawa, Ont., breakwater off point at Cadboro Bay. $50,000. Dpt. P. Wks., Ottawa, Ont., engrs.

BIDS ASKED

Bids Asked December 19

†Illinois—U. S. Eng., $16 U. S. Courthouse & Customhouse, St. Louis 2, Mo., pumphouse structure complete, gravity drainage structures, inlet and outlet ditches, fuel tank installation, pump discharge pipe over levee complete and installing pump. equip. in Spankey Drainage & Levee Dist., Greene Co.

Bids Asked December 21

Illinois—Illinois Div. Waterways, 201 W. Monroe St., Springfield, excavating, cleaning out main ditch of Eldred Drainage and Levee Dist., incl. approx. $1,000 cu. yd. earthwork. $25,000. T. B. Casey, 201 W. Monroe St., Springfield, acting ch. engr. CD 12/8.

Mass., Hull—Commonwealth of Massachusetts, Metropolitan Dist. Comn., Parks Div., 20 Somerset St., Boston, reconstructing portion concrete sea wall at Beach Reservation. Over $15,000. Plans deposit $2.

Mass., Wintrop—Commonwealth of Massachusetts, Metropolitan Dist. Comn., Parks Div., 20 Somerset St., Boston, reconstructing concrete sea wall along Winthrop Shore Reservation. Over $25,000. Plans deposit $2.

Bids Asked December 27

†Oregon—U. S. Eng., 628 Pittock Block, S. W. 10 Ave. and Washington St., Portland, Ore., reconstructing south jetty of Umpqua River at mouth of stream, incl. constructing wharf, 3,800 ft. standard gage land track, 7,600 ft. jetty tramway, 100-ton track scale, placing 125,000 tons stone in jetty cofferdams, excavating, replacing 1,900 yd. existing jetty stone, constructing 1,200 ft. concrete breakwater and terminal. Spec. 695-1010.

Bids Asked December 28

†Louisiana—U. S. Eng., Box 60, Vicksburg, Miss., approx. 140,000 cu. yd. channel enlargement in Loggy Bayou, Red River Parish.

Bids Asked January 16

†Ore., Klamath Falls—Dpt. Interior, Bureau Reclamation, H. W. Bashore, comr., Klamath Falls. Pump. Plants E and F, here, earthwork and structures for Klamath Straits drain outlet, Modoc Unit, Tule Lake Div., Klamath Proj., Oregon-California, 12 mi. south of here, Spec. 1088.

LOW BIDDERS

†Idaho, Boise—U. S. Eng., Pittock Block, S.W., 10 Ave. and Washington St., Portland, Ore., repairing, reconstructing revetments along Boise River, from Morrison-Knudsen Co., Inc., 319 Bway., $58,228.

Ill., Chicago—City, Park Dist., 425 E. 4 St., Dec. 5, sea wall repairs, Jackson Park Yacht Harbor, from H. A. Thompson, 22 N. La Salle St., $40,357. CD 11/30.

†Louisiana—U. S. Eng., foot of Frytania St., New Orleans, Dec. 6, excavating approx. 20,000 cu. yd. earthwork and incidental work, State Canal-Bayou Roseau Drainage Canal, Solic. 16-047-45-37, Avoyelles Parish, from J. L. Edwards, 3335 Gen. Taylor St., New Orleans, $28,620. CD 11/29.

†Ore., Klamath Falls—Bureau Reclamation, Klamath Falls, Nov. 15, constructing Klamath Straits drain outlet, Modoc unit, Tule Lake Div., Klamath Project, Oregon and Calif., Spec. 1082, from George R. Stacy, Box 1898, Parker, Ariz., $68,164. CD 10/20—ENR 10/26.

CONTRACTS AWARDED

★**†N. M., Tucumcari**—Bureau Reclamation, Dpt. Interior, Tucumcari, Schedules 1, 2 and 3, earthwork and tunnel, Conchas Canal. Spec. 1083, to Morrison-Knudsen Co. Inc., P. O. Box 450, Boise, Idaho, $588,270. Bids 11/17. CD 11/28—ENR 11/30. under L.B.

LATIN AMERICA

Brazil, Rio de Janeiro—Linhas Aereas Paulistas, S. A., Rio de Janeiro, plans airfields, to connect cities in central Brazil. $200,000.

Brazil, Rio de Janeiro—Linha Aerea Transcontinental Brasileira S. A., Rio de Janeiro, plans feeded line airfields. $500,000.

Brazil, Rio de Janeiro—Republic of Brazil, Rio de Janeiro, plans sanitation work in Amazon and Rio Doce Valley. $1,000,000. Ministry of Health, Rio de Janeiro, engr.

Brazil, Sao Jose de Tocantins—Republic of Brazil, Rio de Janeiro, plans nickel reduction plant, $350,000. Ministry of Mineral Production, Rio de Janeiro, engr.

B. W. I., Montserrat—Government of Antigua, Antigua City, plans airport. $150,000.

Colombia, Bogota—Compania Nacional de Navigacion, Bogota, plans wharves on rivers. 3,000,000 pesos.

Mexico—Federal Govt., President Avila Camacho, Mexico City, plans 28 packing plants in states of Vera Cruz, Chiapas and Tabasco. $800,000.

Mexico—Ferrocarril, Kansas City, Mexico Y Oriente, S.A., M. A. Camacho, pres., Mexico City, plans extend. main railway line from Ojinaga to Topolobampo. Over $250,000.

Mexico—Mexican Government, Scrita. de Comunicaciones y Obras, Publicas, Mexico, D.F., plans completing highway to link Mexico City with Tuxpan. Petroleos Mexicanos, Ave. Juarez, Mexico City, contributed $315,000. CD 12/1—ENR 12/7.

Mexico, Guadalajara—Town of Guadalajara, and Dpt. Pub. Works & Communications, Mexico City, take bids about January 1, hydro-electric plant. $750,000. CD 11/23—ENR 11/23.

Mexico, Hermosilla—State of Sonora, Governor Adelardo L. Rodriques, Hermosilla, plans constructing dams, near here. $2,000,000.

Mexico, Lower California—Ministry of Public Educ., Palacio del Territorio, Mexicali, B. C., plans schools. $300,000.

Mexico, Mexico City—General Roberto Fierro Villalobos, c/o Secy. Ministry of National Defense, Mexico City, plans light airplane factory. $250,000.

Mexico, Mexico City—J. Duran e Hijos, Madero, 40-218, Mexico, D. F., plans factory to manufacture chrome and nickel plated mouldings. $125,000.

Mexico, Mexico City—Lanas Peinadas Mexicanas, S. A. Balderas, 68, Mexico, D. F. (Lic. Carlos Prieto, rept.), plans washed and combed woolen goods mill. $125,000.

Mexico, Mexico City—Worlds Fair, S. A., Mexico City soon takes bids, enlarging factory. $300,000.

Mexico, Monterrey—La Leona Textile Factory, Monterrey, takes bids by January 1, textile mfg. plant. $350,000. CD 11/20—ENR 11/23.

Mexico, Torreon—Dpt. P. Wks. & Communications, Mexico City, takes bids before January 1, constructing, equipping 40,000 hp. hydro-electric plant. $7,500,000. CD 12/6—ENR 12/7.

Mexico, Vera Cruz—Federal Irrigation Comn., Mexico City, plans repairing flood damage, Papascoapan Valley. $5,000,000. CD 2/3—ENR 2/10.

Netherlands West Indies, Aruba—Government of Netherlands West Indies, Willemstad City, Curacao, plans by Bureau of Public Works, Willemstad City, Curacao, housing project. 500,000 florin.

Panama, David—Banco Nacional, Panama City, plans bank. $175,000.

Paraguay, Asuncion—Municipality, plans waterworks system exten. $150,000.

Paraguay, Asuncion—Republic of Paraguay, Asuncion, plans by Ministry of Health, Asuncion, health centers. $200,000.

Peru, Matarani—Republic of Peru, Lima, plans railway between Matarani and La Joya. $1,000,000.

Venezuela, Sta Elena—Republic of Venezuela, Caracas, plans airport. $200,000. Ministry of Public Works, Caracas, engr.

Venezuela, Zaraza — Republic of Venezuela, Caracas, plans airport. $150,000. Ministry of Public Works, Caracas, engr.

PUBLIC BUILDINGS

PROPOSED WORK

†Ark., Camden—Pub. Housing Auth., NHA, 1205 Electric Bldg., Seventh and Taylor Sts., Fort Worth 1, Tex.; 50 family dwelling units, Ark. 3142.

†Ariz., Yuma—Pub. Housing Auth., NHA, Phelan Bldg., 760 Market St., San Francisco, 7 family trailers, Ariz. 2370.

Calif., Fairfield—Solano Co., c/o Clerk, Court House, plans by H. J. Devine, Cronan Bldg., Sacramento, rein.-con. jail. $200,000.

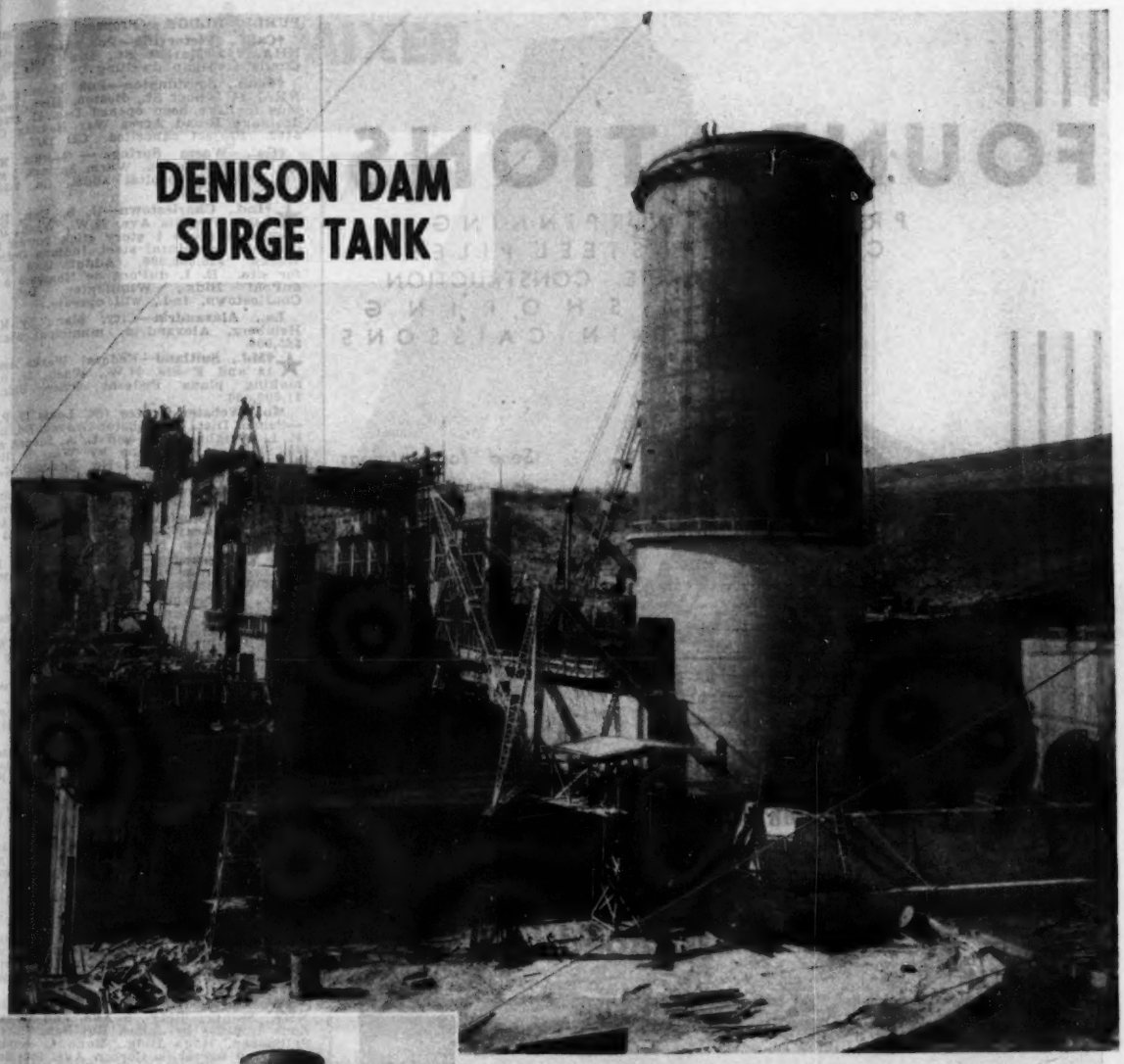
†Calif., Gerber—Pub. Housing Auth., NHA, 760 Market St., San Francisco, 25 family stop-gap dwelling units, Calif. 4963.

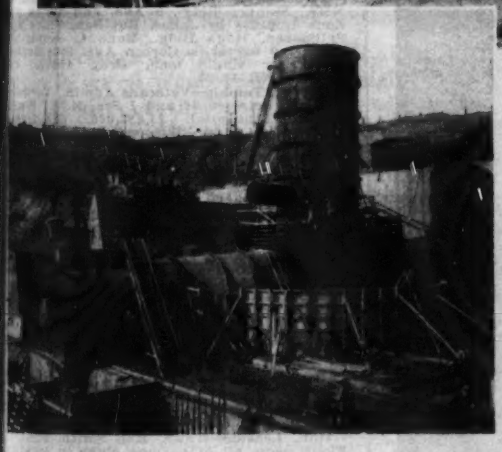
Calif., Roseville—Pub. Housing Auth., NHA, 760 Market St., San Francisco, 40 family stop-gap dwelling units, Calif. 4959.

†Calif., San Diego—San Diego Bd. Educ., Civic Center, school, Naval Housing, Pacific Beach. $150,000. FWA.

†Calif., San Francisco—Pub. Housing Auth., NHA, Phelan Bldg., 760 Market St., 400 accommodations for single persons, Calif. 4968.

†Calif., San Francisco—Pub. Housing Auth., NHA, 760 Market St., San Francisco, 166 family stop-gap dwelling units, Marin Co., and San Salita sub-locality, Calif. 4958; 20 single person stop-gap dwelling units, East Bay, Calif. 4962.





Top illustration: General view of Denison Dam showing 57 ft. diam. by 95 ft. surge tank almost complete. Directly above: Closeup of the tee connecting 20 ft. diam. water conduit to bottom of surge tank.

The 20-ft. diam. penstock, tee and surge tank for the first hydroelectric generating unit in the Denison project on the Red River near Denison, Tex., were fabricated in our shops and erected by our field forces. The penstock and tee are of welded construction with reinforcing rings at regular intervals.

The surge tank, also of welded construction, is 57 ft. diam. by 95 ft. high. A 16¼ ft. diam. restricted orifice in the 20-ft. diam. riser from the tee to the bottom of the surge tank makes for efficient operation at all reservoir levels.

We also fabricated and erected 20-ft. diam. steel linings in five of the eight 20-ft. diam. conduits through the base of the Denison dam. These conduits have riveted joints of the butt-strap type. They are equipped, however, with re-inforcing rings that are welded to the outside of the pipe.

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PUBLIC BLDGS. (Proposed Work, Cost

†Calif., Victorville—Pub. Housing Au NHA, 760 Market St., San Francisco, family stop-gap dwelling units, Calif.

†Conn., Southington—Pub. Housing Au NHA, 24 School St., Boston, Mass., recall bids to have been opened Dec. 11, grad drainage Broad Acres War Housing, Co 6163. Project cancelled. CD 12/7.

†Ga., Warm Springs — Georgia War Springs Foundation, Warm Springs, 2 mas part humat. hospital addn., Ga. 9-346- $343,159. FWA.

★†Ind., Charlestown—U. S. Eng., 21 and Virginia Ave. N.W., Wash., D. preparing plans 1 story stick powder m concrete, structural steel, Indiana Ordnan Works, $28,000,000. Addnl. land secur for site. E. I. duPont de Nemours & C duPont Bldg., Wilmington, Del., Charlestown, Ind., will operate.

La., Alexandria—City, plans by M. Heinberg, Alexandria, municipal abatto $65,000.

★†Md., Suitland—Federal Works Agen 18 and F Sts. N.W., Wash. 25, D. making plans Federal Office Bldg. $1,500,000.

Mo., Webster Groves (St. Louis 19, P. —School Dist. of Webster Groves, Bd. Edu F. L. Wright, pres., and L. A. Steger, sup 42 Selma Ave., plans by Wm. B. Ittn Inc., engrs-archts. 408 Bd. Educ. Bldg., Locust St., St. Louis, Zonal, and soon classroom bldg. and gymnasium Douglass School for Negroes. $267,000.

†N. Y., Starlake—Pub. Housing Auth NHA, 270 Bway., New York, Zone 7, 50 family housing, N. Y. 30178.

N. Y., Syracuse—Dpt. Health, City Hall nurses quarters and storage space. Appli for FWA funds.

★O., Barberton—City, E. Chandler, ch Building Fund, city hospital, Tusca Park. $750,000-$900,000.

†O., Fostoria—Pub. Housing Auth., NHA 2073 E. 9 St., Cleveland, Zone 15, 30 u family stop-gap housing, Ohio 33312.

O., Perrysburg—Bd. Educ., Perrysburg plans by Britsch & Munger, engrs. an archts., Nicholas Ave., Toledo, 1 stor concrete, masonry school addn., $350,00 3 story high school addn., $150,000.

Tex., Houston—City, City Hall, plans b I. R. Klein, 328 Bankers Mtg. Bldg., storag bldg. and workshop, for Glen Brook Park $40,000.

Tex., Port Arthur—City, City Hall, bld soon fire station, $150,000. N. Stewart, Por Arthur, archt.

†Vt., Springfield—Pub. Housing Auth. NHA, 24 School St., Boston 8, Mass., maki ing plans drainage works, storm sewers, housing, Vt. 43011.

★†Va., Fort Myer—U. S. Eng., 1 and Douglas Sts. N.W., Wash., D. C., making plans Sect. B, barracks and mess hall, Sect. A, underpass, south post to Pentagon, Sect. C, street lighting and electrical distr. sys., Sect. D, roads and walks, Sect. E, steam distr. sys., water and sewer exten. $1,500,000.

†Wash., Seattle—Pub. Housing Auth., NHA, Skinner Bldg., 5 Ave. and Union St., Zone 1, plans by Jones, Bouillon, Thiry and Syllianaen, Hoge Bldg., Zone 4, converting 135 army barracks, Corson Ave. into dormitories for single men, Proj. 45272. CD 11/16—ENR 11/23.

★†Wis., Tomah—Veterans Admin., Vermont Ave. between H and I Sts. N.W., Wash. 25, D. C., hospital. $4,880,000. CD 2/16—ENR 2/24, under Wisconsin.

★Que., Montreal—Dominion Govt. c/o Min istry, Veterans Affairs, Ottawa, Ont., plans by M. Parizeau, 14 E. St. James St., 400 dwellings. $1,600,000. CD 6/15—ENR 6/22.

B. C., Metchosin—Province of British Columbia, c/o Dpt. Provincial Secy., Victoria, plans by Dpt. P. Wks., Victoria, boy's industrial school. $150,000. Site purchased.

Man., Brandon—Municipality, public library. $150,000.

N. B., Moncton—Municipality, public library. $150,000.

★N. B., Saint John—Dominion Govt., c/o Ministry of Veterans Affairs, Ottawa, Ont., plans by Alward & Gillies, 1 Market Sq., 200 dwellings. $800,000.

★Ont., Hamilton—Municipality, hospital. $2,600,000. CD 10/18—ENR 10/26.

Ont., Leamington—Municipality, memorial hospital. $150,000.

Ont., Leaside—Town, Ken Smith, chn., C. Floor, secy. all of various clubs in locality, memorial community centre, incl. group bldgs., incorporating and indoor swimming pool, theatre, gymnasium, lecture hall, banquet hall, craft rooms, 30,000 book library. About $250,000.

Ont., London—Secy. Dpt. P. Wks., Ottawa, plans by C. D. Sutherland, c/o Dpt. P. Wks., Ottawa, 200 room nurses' residence, Westminster Hospital. $250,000-$300,000.

Ont., Peterborough—Separate School Bd., Peterborough, plans by J. H. Haffa, 94 W. Bloor St., Toronto, high school. $200,000.

★Ont., Peterborough — Municipality, J. Hamilton, mayor, hospital. $800,000.

Ont., Welland—Bd. Educ., J. W. Tesky, secy., plans by W. L. Somerville, 30 W. Bloor St., Toronto, high school. $200,000.

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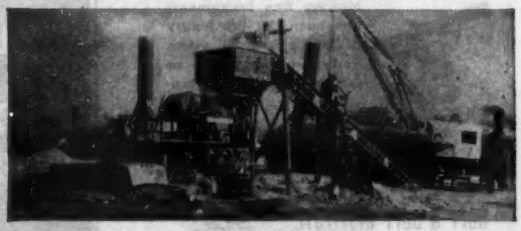

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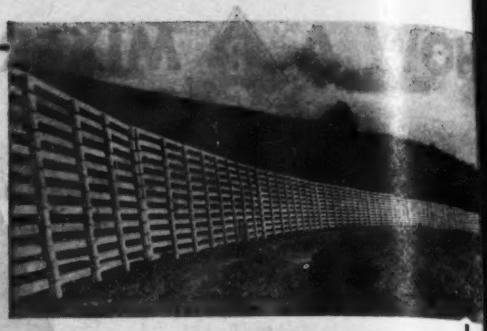

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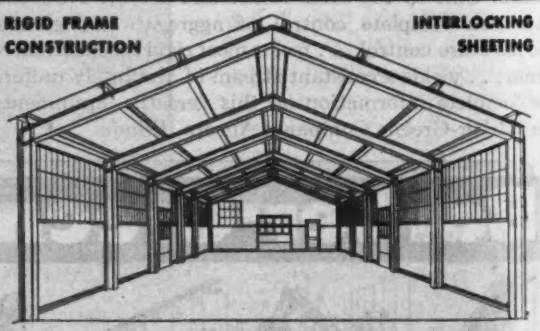

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PUBLIC BLDGS. (Proposed Work, Cont'd.)

Que., **Knowlton**—School Bd., J. W. Mar-..., secy., bids soon 2 story, bamnt., 30x185 ... brick, frame high school, concrete fdn. $150,000. Lawson & Little, 660 W. Ste. Catherine St., Montreal, archts. CD 11/22—ENR 11/30.

Sask., **Moose Jaw**—Province of Saskatchewan, c/o Ministry of Resources, Regina, plans by Dpt. P. Wks., Regina, blanket, mackinaw cloth, quilt woolen mill mfg. plant. $40,000.

BIDS ASKED

Bids Asked December 19

Ind., **Rushville**—City Clerk, City Hall, light plant addns. and equip. $250,000. Extended date. Bevington, Taggart & Fowler, Inc., 730 Ind.-Pythian Bldg., Indianapolis, consult. engrs. D. Long, City Hall, city engr. CD 11/6—ENR 11/9.

†Mich., **Ecorse**—J. P. Sumeracki, secy. Wayne Co. Bd. Auditors, 201 County Bldg., Detroit, brick, steel, concrete health clinic bldg., Mich. 20-369. $150,000. **FWA.** Plans deposit $10. Eberle M. Smith & Associates, 208 Murphy Bldg., 13700 Woodward Ave., Highland Park, archts. CD 10/31—ENR 11/2.

†N. C., **Raleigh**—State Hospital, Dix Hill, 1 story nurses' home addn. at Dix Hill Hospital for Insane, N.C. 31-293-N. $108,200. **FWA.** Plans deposit $25 for building plans and $10 for plumbing, heating and electrical plans. Northup & O'Brien, Winston-Salem, archts. CD 11/21—ENR 11/30.

Bids Asked About December 19

†Kan., **Sunflower Village (RFS Eudora)**—Pub. Bldgs. Admin., 18 and F Sts. N.W., Wash. 25, D. C., 1 story, concrete block recreation bldg., Docket No. 14-263. $135,000. **FWA.** Neville & Sharp, 801 Midland Bldg., Kansas City, Mo., archts. CD 10/30—ENR 11/2.

Bids Asked December 20

Mich., **Melvindale**—R. L. Jolly, secy. School Bd., 2 story, 12 room brick, steel, concrete school, for Dist. 11, Ecorse Twp. $150,000. Plans deposit $10. Eberle M. Smith & Associates, 208 Murphy Bldg., 13700 Woodward Ave., Highland Park, archts.

†S. C., **Anderson**—Anderson County Hospital Assn., Dr. F. Wrenn, pres., at office C. W. Fant, archt., 109½ Sharpe St., nurses' home, SC 243-N. Plans deposit $25, Sect. A, $5, Sect. B. CD 11/15—ENR 11/23.

Bids Asked December 22

†Mass., **Fall River**—Truesdale Hospital, 1220 Highland Ave., nurses home, Highland Ave., Mass 19-191-N. **FWA.** Plans deposit $10 each set. E. I. Marvell, 209 Bedford St., archt. CD 8/16—ENR 8/24.

†Mich., **Royal Oak**—Royal Oak Twp., 10 room, brick, steel, concrete school, Mich. 20-362. $150,000. **FWA.** George D. Mason & Co., 400 Griswold St., Detroit, Zone 26, archts. CD 12/6—ENR 10/12.

†Va., **Dublin**—Pub. Housing Auth., NHA, Georgia Savings Bank Bldg., Peachtree and Broad Sts., Atlanta, Ga., rehabilitation and addn. to war housing, Va. 44162, Radford and Pulaski Area. Plans deposit $25. Williams, Colle & Pipino, Melson Bldg., Newport News, archts.

Bids Asked December 27

†Wash., **Bryn Mawr**—E. W. Morrison, archt., 719 2 Ave., Seattle, 1 story, frame, masonry fire station, Wash. 45-313, for Fire Protection Dist. 20. $20,000. **FWA.** Plans deposit $25. CD 11/6—ENR 11/9.

Bids Asked December 28

Calif., **Woodland**—Yolo Co., c/o Clerk, Court House, 70-bed hospital. $197,000. Plans deposit $20. W. D. Peugh, 333 Montgomery St., San Francisco, archt. CD 12/21/43—ENR 12/23/43.

†Va., **Blackstone**—Federal Works Agency, 601 State Planters Bank Bldg., Richmond, Zone 19, health center, Va. 44-348. A. M. Lublin, Dickson Bldg., Norfolk, archt.

Bids Asked January 2

Ind., **Washington**—Bd. P. Wks., S. H. Harris, mayor, chn., City Hall, imprv., equipping, 1 story municipal power plant incl. raising roof, structural steel, 5,000 kw turbo-generator, 10,000 gpm 2-pass surface type condenser, 2 double suction horizontal split case bronze fitted water circulating pumps 6,000 gpm cap. each, 2 motor driven pumps 136 gpm cap. each. $100,000. Plans deposit $25. Bevington, Taggart & Fowler, Inc., 730 Indiana-Pythian Bldg., Indianapolis, engrs. CD 11/3—ENR 11/9.

Bids Asked January 5

†Conn., **Bridgeport**—City, Geo. Wellington, pres. Bd. Fire Comrs., Middle St., fire station, Sylvan Ave. and Old Town Rd., Conn. 6-221. A. H. Pokras, 436 Salem St., archt., firehouse, Broadbridge Ave. and Huntington Trpk., Conn. 6-220, T. Vece, 1214 Main St., archt. **FWA.** CD 8/22—ENR 8/24.

Bids Asked January 16

†Ill., **Dwight**—Veterans Admin., Vermont Ave. between H and I Sts. N.W., Wash. 25, D. C., addnl. bldgs., utilities.

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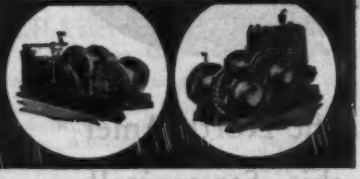

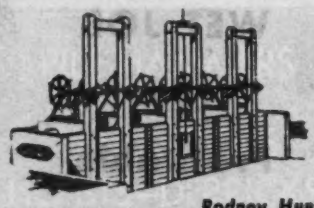

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PUBLIC BLDGS. (Low Bidders, Cont'd.)

LOW BIDDERS

★†Ala., Tuscaloosa — Veterans Admin., Vermont Ave. between H and I Sts. N.W., Wash. 25, D. C., Dec. 5, addnl. bldgs., utilities, from City Constr Co., 914 Houston Ave., Bridgeport, Conn., $750,000. CE 10/25—ENR 10/26.

†Calif., Livermore—Pub. Housing Auth., NHA., Phelan Bldg., 760 Market St., San Francisco, 124 temporary family dwelling units, Calif. 4596-N, from Close & Lewis, 72 C St., Hayward, $322,312. CD 11/27.

★†Calif., Long Beach — Pub. Housing Auth., NHA, 816 W. 5 St., Los Angeles, Dec. 1, 268 temporary family war dwelling units, Calif. 4904—N, from Wesco Constr. Co., 2000 Hyperion Ave., Los Angeles, $734,429.

†Calif., San Lorenzo—Pub. Bldgs. Admin., 18 and F Sts. N.W., Wash. 25, D. C., Dec. 1, Ashland School, Unit 2, and San Lorenzo School, Calif. 4-640-F, from George Peterson & Sons, San Leandro, $162,000. FWA. CD 11/13—ENR 11/16.

★†Va., Martinsville—Martinsville General Hospital, Inc., Peoples Bank Bldg., Dec. 7, hospital, Va. 44-370, from Harry B. Graham Co., P. O. Box 630, Charlottesville, $524,623. FWA. CD 11/15—ENR 11/23.

CONTRACTS AWARDED

†Calif., Bakersfield — Dpt. Agriculture, Emergency Rubber Project, 315 W. 9 St., Los Angeles, rubber extracting plant, to G. E. Hall, 1326—20 St., $139,250. Bids 11/1. CD 11/20—ENR 11/23.

★†Calif., San Diego—Pub. Housing Auth., NHA, Phelan Bldg., 760 Market St., San Francisco, 348 family dwelling units, at Coronado, Calif. 4901-N, to Wm. C. Crowell Co., 170 E. California St., Pasadena, $632,000. CD 11/23—ENR 11/30, under LB.

★†Calif., San Diego—Pub. Housing Auth., NHA, Phelan Bldg., 760 Market St., San Francisco, 352 family dwelling units, community bldg., site imprvs., Calif. 4915-N, to Wm. C. Crowell Co., 170 E. California St., Pasadena, $940,933. CD 12/4—ENR 12/7.

†Calif., San Pedro—Pub. Housing Auth., NHA, 760 Market St., San Francisco, 61 housing units, Calif. 4913-N, to Geo. B. Thatcher, 4074 Laurel Canyon Blvd., North Hollywood, $245,462. CD 12/8.

†Calif., Santa Ana—Pub. Housing Auth., NHA, 760 Market St., San Francisco, 76 war housing units, Calif. 4912-N, to Donaldson Constr. Co., 727 W. 7 St., Los Angeles, $186,563. CD 11/27—ENR 11/30, under LB.

†Ga., Savannah—Warren A. Candler Hospital, 116 E. Huntingdon St., nurses home and school, Ga. 9-298-N, to Mion Constr. Co., Box 1145, Atlanta, $186,500. FWA. Bids 11/29. W. C. Marshall, 221 E. 51 St., Savannah, archt. CD 10/3—ENR 10/5.

★†D. C., Wash.—George Washington University, 2029 G St. N.W., hospital, Washington Circle, to Charles H. Tompkins Co., 907 16 St. N.W. Est. $3,000,000. FWA. CD 9/30—ENR 9/23.

★†D. C., Wash.—Georgetown University, 37 and O Sts. N.W., 400 bed hospital. D. C. 49-100, to John McShain, Inc., 17 and Spring Garden Sts., Phila., Pa., $2,000,000. FWA. Awarded 12/1. CD 9/30—ENR 9/23.

†Ind., Terre Haute—U. S. Eng., 612 Federal Bldg., Louisville, Ky., restoring warehouse, Terre Haute Ordnance Depot. Contr. W-15-029-eng-760, to Glenn W. North, t/a Glenn W. North Const. Co., 9 and Tippecanoe Sts., est. $79,253.

†La., Shreveport—PLANT—J. B. Beaird Steel Co., 8200 St. Vincent Ave., artillery shell mfg. plant, force account, sub-contracts. $300,000. Defense Plant Corp. will finance. CD 11/22—ENR 11/30.

†Mich., Highland Park (br. Detroit)—U. S. Eng., 760 Union Guardian Bldg., Detroit, Zone 31, 6 warehouses and storage area. Contr. W-20-064-eng-1250, Webber Industrial Storage Depot, to Bryant & Detwiler Co., 2304 Penobscott Bldg., Detroit, $343,996.

†Mo., St. Louis—U. S. Eng., 816 U. S. Courthouse and Customhouse, St. Louis Zone 2, structural alterations, Chevrolet Shell Div. Forging Plant. Contr. W-23-066-eng-649, to Alport-Carlo Const. Co., Ambassador Bldg., $178,840; electrical work Contr. W-23-065-eng-648, to S. C. Sachs d/b/a, S. C. Sachs Co., 2022 N. 9 St., $189,450.

†Mo., St. Louis—St. Mary's Infirmary, Sisters of St. Mary, Inc., c/o Mother M. Concordia, pres., 6420 Clayton Rd., Richmond Heights, Zone 17, 5 story, L-shaped brick, rein.-con. nurse's home, incl. classrooms, cafeteria, etc., 1526 Papin St., Mo. 23-308N, to John B. Gutmann Const., Rialto Bldg., 220 N. 4 St. Zone 2, $245,245. FWA. Bids 11/30. CD 11/13—ENR 11/16.

†N. Y., Corona—U. S. Eng., 120 Wall St., New York, Zone 5, film storage valuts, to John H. Eisele Co., Inc., 18 E. 41 St., New York, Zone 17, $60,369.

★†New Jersey—U. S. Eng., 120 Wall St., New York 5, N. Y., storage facilities for industrial surplus storage depots in vicinity of Jersey City, Newark and Linden, to Del Balso Constr. Corp., 220 E. 42 St., New York, N. Y. $1,056,638.

PUBLIC BLDGS. (Contracts Awarded, Cont'd.)

†N. C., Cherry Point (br. New Bern)—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., barracks, mess hall, Bachelor Officer's Quarter Bldgs., 1 and 2, family guest hall, etc. 16813, NOY 10402, to T. A. Loving & Co., Goldsboro, $1,445,576. Bids 11/25. J. C. MacKenzie, 5 E. 57 St., New York 22, N. Y., archt. CD 11/30.

†O., Lima—U. S. Eng., 700 Union Guardian Bldg., Zone 31, Detroit, Mich., addnl. facilities, Lima Tank Depot, Contr. W-20-064-eng-1251, to deKoning Const. Co., Kalamazoo, Mich., $99,400.

★†Pa., Johnstown—U. S. Eng., Standard Oil Bldg., Baltimore, Md., erecting 4 rotary hearth furnaces, Johnstown Forging plant, Contr. W-18-020-eng-716, to Salem Engrg. Co., Salem, O., $69,178.

★†Pa., Locust Summit—Day & Zimmerman, Inc., engrs.-archts., Packard Bldg., Phila., briquet coal mfg. plant for American Briquet Co., 1417 Sansom St., Phila., separate contracts. $1,250,000. Defense Plant Corp. will finance. CD 10/30—ENR 11/2.

†Pa., St. Nicholas—Day & Zimmerman, Inc., engrs.-archts., Packard Bldg., Phila., briquet coal mfg. plant, for American Briquet Co., 1417 Sansom St., Phila., separate contracts. $1,250,000. Defense Plant Corp. will finance. CD 10/30—ENR 11/2.

†Tex., Houston—Nyotex Chemicals, Inc., Mellie Esperson Bldg., chemical plant unit, to Leonard Constr. Co., 37 S. Wabash St., Chicago, Ill., $45,000. Defense Plant Corp. will finance. Harshaw Chemical Co., E. 97 St., Cleveland, O., engrs. CD 11/23—ENR 11/30, under Industrial.

†Utah, Ogden—U. S. Eng., 1209 8 St., Sacramento 8, Calif., insulating and heating Warehouse Bays 38, 40, 49, 54 and 55, Ogden Air Depot, to Olson Constr. Co., 250 E. First South St., Salt Lake City, $42,838. Bids 12/1.

†Va., Dam Neck—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., ammunition storage magazines, A.A.T. and T.C., NOY 10987, to Abbott & Ritchie, P. O. Box 291, Newport News, $41,511.

†Va., Front Royal—Pub. Housing Auth., NHA, Georgia Savings Bank Bldg., Peachtree and Broad Sts., Atlanta 3, Ga., removing 120 demountable housing units from Newport News, to here, Va. 44331, to Mitchell & Zerkel Co., 1343 N.H. Ave. N.W., Wash. 25, D. C., $234,687. CD 11/15—ENR 11/23.

N. S., Point Edward—Dpt. National Defense (Sea), Ottawa, Ont., stores bldg. at Naval Base, to M. R. Chappell, Brookland Ave., Sydney. $333,000.

Que., Hull—Wartime Housing Ltd., 55 York St., Toronto, Ont., 125 houses, to Hill-Clarke-Francis, Ltd., New Liskeard, Ont., about $375,000. CD 10/10—ENR 10/12.

Ont., Ottawa—Dpt. P. Wks. and National Research Council, Ottawa, test bldg., Montreal Rd. near here, to Doran Constr. Co., Ltd., 78 Bank St., $50,000.

COMMERCIAL BUILDINGS

PROPOSED WORK

Mich., Detroit — Federal Department Stores, 444 W. Willis St., plans by C. N. Agree, 1140 Book Tower, 2 story, bsmnt., brick, steel, concrete store. $300,000.

Neb., Hastings—Mary Lanning Memorial Hospital Assn., Hastings, plans by Davis & Wilson, 625 S. 13 St., Lincoln, hospital addn. $151,000. Applied to FWA.

O., Cleveland—A. Bruscino, 17309 Madison Ave., 400 one family dwellings, W. 140 St., and 25 one family dwellings, Bruce and Russell Rds., Bay Village. $8,000 each.

O., Cleveland—Morris Gillen, 3444 Milverton Rd., approx. 50 five room, 1 family, frame, brick houses. $375,000.

O., Euclid (br. Cleveland)—M. C. Smith, 26130 Zeman Ave., Cleveland, 25 five room brick dwellings. $8,000 each.

Tex., Houston—Jno. H. Colman, Shell Bldg., plans by I. R. Klein, 323 Bankers Mortgage Bldg., 100x200 ft., brick, reinforced con., hollow tile, etc. community center. $150,000.

Wash., Seattle—J. P. Angel, 2221 Broadway Ave. N., plans by R. Goteland, Railway Exch. Bldg., shopping center at Skyway Park housing. $150,000.

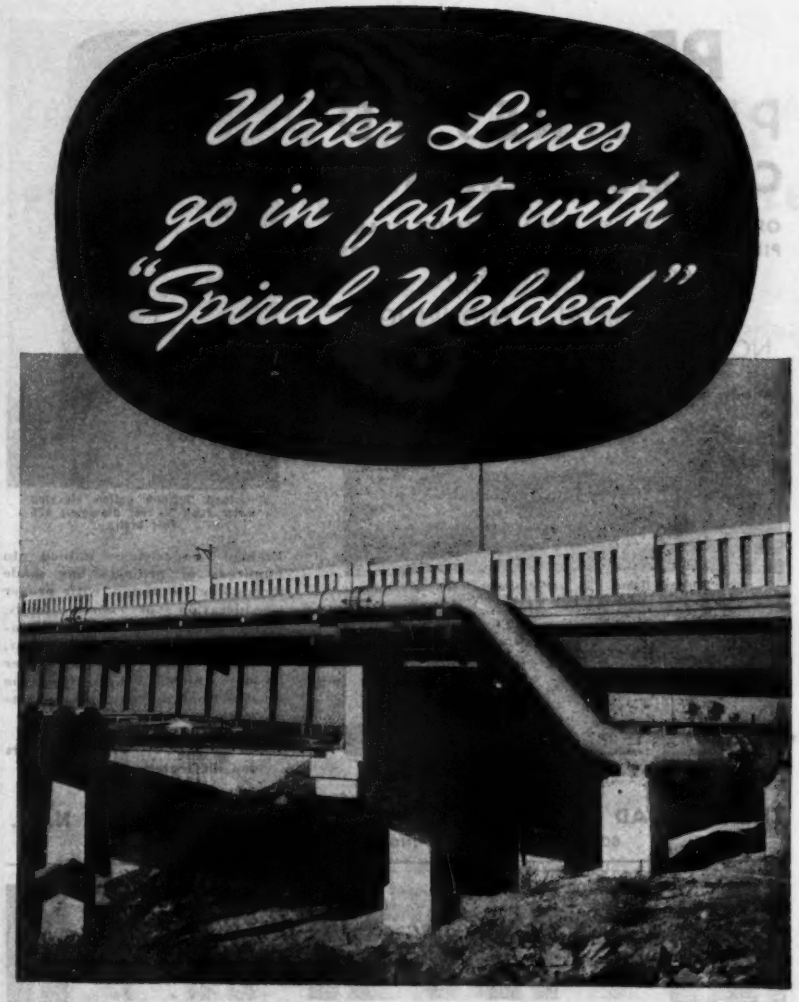
★Wash., Seattle—J. M. Colman Co., Colman Bldg., 1 and Columbia Sts., Zone 4, reconstructing Canadian National pier for use as ferry terminal. $500,000.

Alta., Medicine Hat — Assiniboia Hotel Ltd., Medicine Hat, hotel. $150,000.

Man., Winnipeg—Manitoba Command, Canadian Legion, 203 Lombard Bldg., plans by Major A. M. Pratt, 1000 Electric Rly. Chambers, legion headquarters, Memorial Blvd. $350,000. CD 11/14—ENR 11/16.

Newfoundland, Windsor—Cohen & Son, Main St., commercial block. $150,000.

Ont., Alexandria—De Peres Dominicaine, 5375 Notre Dame de Grace Ave., Montreal, Que., plans by L. Lemieux, 760 Victoria Sq., Montreal, Que., retreat. $150,000.



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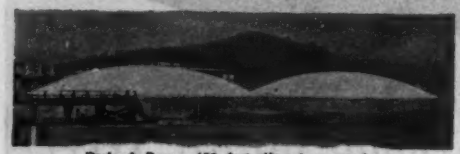

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COMMERCIAL BLDGS. (Proposed Work Cont'd.)

★**Ont., London**—Alumni Association of Huron College, London, plans by O. R. Moore & Co., 499 Richmond St., Church of England College on campus of University of Western Ontario. $511,000.

Ont., Ottawa—Canadian Legion, c/o W. Thompson, Trafalgar House, 1 story, banquet bldg. exten., incl. auditorium, concert hall, bowling alleys, billiard rooms. Cartier St. $150,000.

Ont., Ottawa—Salvation Army, Wellington St., plans by architect, c/o Major H. W. Janes, Grace Hospital, hospital extension. $200,000.

Ont., St. Catherines—Niagara Peninsula Sanatorium, c/o Dr. C. G. Shaver, St. Catherines, sanitorium addn. $175,000.

Ont., Toronto—Newfoundland Assn., c/o A. Drake, 403 Williard Ave., association recreational centre and offices. $150,000.

Que., Lachine—Roman Catholic Parish of Blessed Sacrament, c/o Rev. J. A. Garieppy, 50 Provost St., church and presbytery. $125,000.

Que., Longueuil—L'Lamarche & Co., Longueuil, plans by P. Paquette, 1010 W. St. Catherine St., Montreal, 90 cottages. $360,000.

Que., Montreal—John Williscroft, 409 W. Mount Royal Ave., apartment. $150,000.

Que., St. Jacques—Congregation of the Sisters of Ste. Anne, Principale St., plans by J. N. Beauchamp, 82 Notre Dame St. W., Montreal, convent addn., St. Jacques L'Achigan. $200,000.

★**Que., Three Rivers**—Le Centre Maurecien, J. A. Bherer, secy., 1461 Blvd. St. Louis, 132 houses. $660,000.

Que., Verdun—R. C. Parish of Notre Dame de la Paix, Rev. J. A. Gervais, pastor, 3441 Blvd. La Salle, sketches made by Ludger and P. Lemieux, 760 Victoria Sq., Montreal, church and presbytery, Gertrude and Strathmore Aves. $280,000.

Sask., Regina—Federated Co-Op. Ltd., Regina, 4 story, commercial bldg. $150,000.

CONTRACTS AWARDED

Tex., San Antonio—National Hotel Co., Anico Bldg., Galveston, modernizing, reconverting 6 story Menger Hotel and store bldg., to J. L. Harwell, 2618 E. Houston St., $275,000. A. S. Fraser, 624 American National Insurance Bldg., Galveston, archt.

Ont., Hamilton—St. Joseph's Hospital, 216 John St. S., 3 story hospital addn., to Pigott Const. Co. Ltd., Pigott Bldg., 36 James St. S., about $175,000.

Que., Gaspe—Les Ursulines De Gaspe, Gaspe, convent bldg., to A. Bedard, 136 St. Patrick St., Quebec City, about $225,000. G. F. Caron, 142 St. Jean St., Quebec City, archt.

Que., Magog—R. C. School Comm., Magog, college addn., to Tremblay & Bonin, 70 Wellington St., Sherbrooke, $150,000.

Que., Quebec City — Metropolitan Stores Ltd., 136 Dundas St., London, departmental store, St. Johns St., to Principal Investments, Ltd., 465 Bay St., Toronto, Ont. Est. $150,000. S. Kohn, c/o owner, archt. CD 10/25 —ENR 11/16, under Post War Projects, Commercial Buildings.

INDUSTRIAL BUILDINGS

PROPOSED WORK

Ark., Stuttgart—SUB-STATION—Arkansas Power & Light Co., Simmons National Bldg., Pine Bluff, and 123 W. 4 St., Little Rock, electric power sub-station. $75,000.

Conn., Cos Cob — STORAGE UNIT — The New York, New Haven & Hartford, R.R. Co., E. E. Oviatt, ch. engr., Water St., New Haven, brick storage unit, at power station. $45,000.

Conn., Fairfield—SHOP AND SERVICE—Seaboard Freight Lines, Inc., State St. exten., 1 story, bsmnt., 75x150 ft., concrete, steel shop and service, boiler plant $40,000. Fletcher Thompson, Inc., 211 State St., Bridgeport, engrs.

Conn., Fairfield — SHOP, etc. — Seaboard Freight Lines, Inc., State St. exten., 1 story, bsmnt., 75x150 ft., concrete, steel shop and service garage. State St. exten. Fletcher Thompson, Inc., 211 State St., Bridgeport, engrs. CD 12/6.

Conn., New Haven — FACTORY — New Haven Pulp & Board Co., 259 East St., completing plans by Westcott & Mapes, Inc., 139 Orange St., factory alterations, construct small structures incl. 1 story, 12x26 ft. pumphouse, tanks, fdns. for tanks, installing trolley machine fdns., steel plate, 130,000 gal. settling tank. $40,000. F. L. Smith, 21 East 40 St., New York, N. Y., engr.

Conn., New London—GARAGE, etc.—Cushman Burke Motors, Inc., c/o F. S. Langdon, archt., 335 State St., 1 story, 30x100 ft., and 57x125 ft., brick, steel, cinder blocks garage, showrooms, etc., Broad St. $45,000.

Ind., Indianapolis—BOILER HOUSE—Indianapolis Power & Light Co., H. T. Pritchard, pres., E. E. Scott, secy., Electric Bldg., preparing plans 1 story, bsmnt. brick, rein.-con., structural steel boiler house. $300,000. Gibbs & Hill, Inc., 450 4 Ave., New York, N. Y., engrs.

INDUSTRIAL BLDGS. (Proposed Work, Cont'd.)

La., **Abbeville**—PLANT—L. M. Thomas, Abbeville, frozen food locker plant. $40,000.

Mich., **Muskegon** — PLANT — Campbell, Wyant & Cannon Foundry Co., Muskegon, plant addn., for production of centrifugal cast cylinders linings. $156,000.

Mich., **Muskegon Heights**—FACTORY—Shaw-Box Crane & Hoist Co., Muskegon Heights, brick, steel, concrete factory. $6,560.

N. J., **Bergenfield**—FACTORY—L. Opperman Co., Inc., 55 Central Ave., Rochelle Park, plans by W. Bartels, 272 Main St., Hackensack, 1 story, 60 x 221 ft., brick, concrete block mfg. bldg., Newbridge Rd., west of Railroad. $45,000.

N. J., **Paterson**—FACTORY—Bogue Elec. Co., 27 Kentucky Ave., plans by Fanning & Shaw, 49 Ward St., 2 story, 65 x 200 ft., brick, steel mfg. bldg.

North Carolina and Virginia—GARAGES—Carolina Coach Co., 1201 S. Blount St., Raleigh, N. C., rejected bids Dec. 6, two 71 x 80 ft., masonry bus garages, Jacksonville, N. C. and Norfolk, Va. J. M. Edwards, Insurance Bldg., Raleigh, N. C., archt. CD 11/25—ENR 11/30.

O., **Canton**—PLANT—Canton Drop Forging & Mfg. Co., 207 12 St. S.E., remodeling plant bldgs. $100,000 or more.

O., **Cleveland**—FREIGHT TERMINAL—Continental Transportation Corp., M. K. Darling, vice pres., 3192 E. 65 St., 1 story, 127x400 ft., brick, steel freight terminal. $150,000.

O., **Cleveland** — PLANT — National Tube Co., C. R. Cox, pres., Lorain, adding 3 batteries (50 ovens each), to increase capacity coke mfg. plant.

O., **Columbus**—FACTORY—Smith Bros. Welding Co., G. J. Smith, mgr., 1873 Leonard Ave., 1 story, 70x125 ft., concrete block, steel factory. $40,000.

O., **Newton Falls**—PLANT—Republic Steel Corp., A. McAllister, purch. agt., Republic Bldg., Cleveland, altering steel plant. $40,000.

O., **Willoughby**—FACTORY—Ohio Rubber Co., E. Winegar, constr. engr., Ben Hur Ave., making plans 1 story, 160x460 ft., brick, concrete block, steel factory addn. $200,000.

Ore., **Astoria** — FISH CANNERY — Sebastian-Stuart Fish Co., foot of 8 St., fish cannery. $60,000.

Ore., **Newport**—PLANT—Yaquina Bay Fish Co., Newport, plans by Ertz & Burns, Pittock Block, Portland, cold storage plant. $60,000.

Ore., **Springfield** — PLANT — Clear Fir Sales Co., Tiffany Bldg., Eugene, lumber re-manufacturing plant with 24x200 ft. loading dock, cut-up plant, 600 ft. single track siding. $200,000. M. Mitchell, Eugene, engr.

Ore., **Warrenton** — PLANT, etc. — Bioproducts Oregon, Ltd., P. O. Box 1, Port Terminals, Astoria, plans by J. E. Wicks, 515 Commercial St., Astoria, cold storage and vitamin mfg. bldg., $40,000; plant and office bldg., $50,000, both 1 story, rein.-con.

Pa., **Meadville**—PLANT—American Viscose Corp., J. L. Shade, purch. agt., Delaware Trust Bldg., Wilmington, Del., preliminary surveys plant expansion. J. P. G. Kell, Marcus Hook, engr.

Pa., **Philadelphia**—PLANT—Reading Co., E. Y. Allen, ch. engr., Reading Terminal, Phila., Zone 7, soon lets contract repairs and new construction at mfg. bldg., 640 N. 8 St. $45,000. CD 11/29—ENR 12/7.

Pa., **Sharon**—PLANT—Westinghouse Electric & Mfg. Co., Maloney Bldg., Pittsburgh, reconstructing plant. $56,163.

Pa., **Port Allegany** — WAREHOUSE — Pittsburgh Corning Corp., J. P. Staple, gen. mgr., 224 Duquesne Way, Pittsburgh, 1 story brick warehouse, $80,000. The John W. Cowper Co., Inc., Sidway Bldg., Buffalo, N. Y., engr.

Tex., **Amarillo** — WAREHOUSE — Furr Food Stores, Amarillo, 140x200 ft., brick, cast stone, rein.-con. warehouse. $50,000. J. Roy Smith, Blackburn Bldg., engr.

Tex., **Cementville (mail San Antonio)**—MANUFACTURING PLANT WATER COOLING UNIT—San Antonio, soon lets contract, Portland Cement Co., 1301 W. Martin St., San Antonio, water, cooling unit for cement mfg. plant, diesel engine operated. W. E. Simpson, 1446 Milant Bldg., San Antonio, engrs.

Tex., **Bay City**—PLANT—American Rice Growers Assn., 7500 Washington Ave., Houston, rice drying plant, rein.-con., silo type. $80,000. Central Engineering Co., 1210 Texas Ave., Houston, engrs.

Tex., **Dallas**—WAREHOUSE—Texas Co., 2310 S. Lamar St., warehouse. $40,000.

Tex., **Dallas**—STORAGE—Ring & Brewer Bldg., 1303 Elm St., constructing 2 floors for storage and air-conditioning entire bldg. $45,000.

Tex., **Edinburg**—PLANT—Lone Star Fruit Co., Edinburg, 1 and 2 story citrus packing plant unit. $45,000.

Tex., **Harlingen** — PLANT — A. W. Lyons Poultry & Egg Produce Co., Harlingen, 1 story produce plant unit. $45,000.

Tex., **LaFeria**—PLANT—Inter-State Fruit & Vegetable Co., La Feria, citrus packing plant unit. $40,000.

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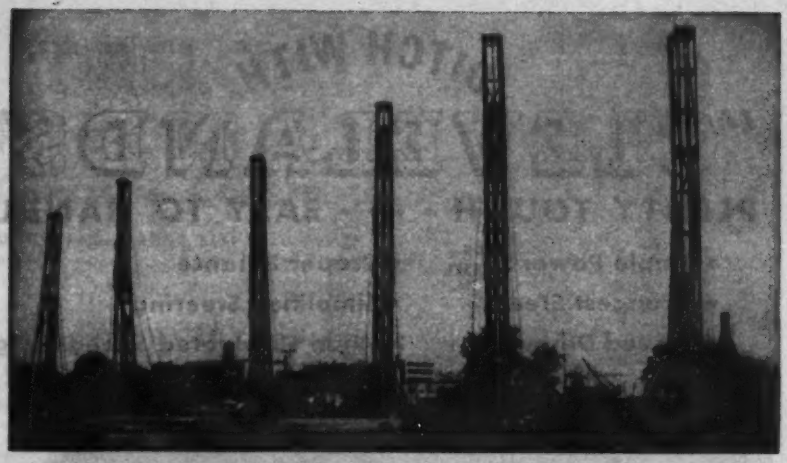

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INDUSTRIAL BLDGS. (Proposed Work Cont'd.)

Tex., McAllen—PACKING PLANT—South Texas Produce Co., McAllen, citrus and vegetable packing plant unit, $40,000.

Tex., Mission — PLANT — Mission Food Products Co., brick, concrete, metal, etc. processing plant unit. $40,000.

Tex., Oak Cliff (mail Dallas)—Oak Cliff Auto Parts Co., 101 N. Marsalis (Oak Cliff), Dallas, brick, steel, concrete storage and mechanical repair shop. $40,000.

Tex., Pharr—PLANT—Gulf Produce Co., Pharr, 1 story, citrus and vegetable packing plant. $40,000.

Tex., San Antonio—PLANT—Berry Packing Co., 400 Medio St., rein.-con. packing plant unit. $40,000.

Tex., Wichita Falls—PLANT—C. L. Murphy & Associates, 1112 7 St., 600 locker plant unit. $40,000.

Tex., Weslaco—PLANT—American Fruit Growers, Inc., Weslaco, 1 and 2 story citrus and vegetable packing plant. $45,000.

Utah, Salt Lake City—SHOP BLDGS.—Denver & Rio Grande Western R.R. Co., A. E. Perlman, ch. engr., Rio Grande Bldg., Denver, Colo., 2 shop bldgs. at Salt Lake City Yards. $69,000.

Wis., Ellsworth—PLANT—Ellsworth Co-operative Creamery Assn., Ellsworth, plans by Slifer & Cone, 442 Endicott Bldg., St. Paul, Minn., 1 story, 36 x 50 ft. milk dehydrating plant addn., 1 story, 25 x 44 ft. boiler house, concrete, steel, brick concrete fdns.

Wis., Fond du Lac—GARAGE—Service Motors, Inc., 33 E. 1 St., 1 story, 71x136 ft., concrete block, steel truss and columns garage, concrete block gdn.

Wis., Green Bay—PLANT—Farm Implement Co., 217 S. Bway., plans by Feldhausen & Coughlen, Columbus Bldg., 1 story, 80x120 ft., brick, farm implement bldg.

Wis., Janesville—BUS GARAGE—Cardinal Lines, Inc., 328 State St., 1 story, 100 x 200 ft., rein.-con., brick, steel bus garage, concrete fdn. A. Kuenzi, 202 N. Water St., Watertown, engr.

Alta., Calgary—PLANT—U.F.A. Central Cooperative Assn., Ltd., 125-11 Ave., plant addn., 121-123 11 Ave. $41,500.

Alta., Edmonton—PLANT—Canada Packers Ltd., 2200 St. Clair Ave. W., Toronto, Ont., altering plant, installing equip. $119,050 equipped.

B. C., Britannia Beach—PLANT—How Sound Mines Ltd., Britannia Beach, surface mining plant, mill, etc. $70,000.

B. C., Haney—COLD STORAGE PLANT—Clappison Bros., Haney, plans by McCarter & Nairne, Marine Bldg., Vancouver, cold storage plant. $40,000.

B. C., Lasqueti—DIAMOND DRILLING—Santiago Mines Ltd., 729 Vancouver Block, Vancouver, diamond drilling on holdings at Phillips Arm, at Lasqueti Island. $150,000.

B. C. Moyie—MINING—St. Eugene Mining Corp., c/o Ventures of B. C. Ltd., 25 W. King St., Toronto, Ont., lead, zinc, silver mines development necessary bldgs. $70,000.

B. C., Vancouver—SHOP—Aeronomic Ltd., 675 Davie St., machine and repair shops. $40,000.

B. C., Victoria—WAREHOUSE—McLennan McFeely and Prior Ltd., 99 Cordova St., Vancouver, 120x186 ft. warehouse, Discovery and Government Sts. $47,500.

Manitoba—DIAMOND DRILLING—Northern Canada Mines, Ltd., 44 Victoria St., Toronto, Ont., diamond drilling in Snow Lake Area at How-En Group and Snow Group. $60,000.

Man., Brandon—GARAGE—Canadian Motors Ltd., Rosser Ave. and 6 St., garage and service station. $40,000.

Man., Ilford—DIAMOND DRILLING—Wekusko Consolidated Ltd., c/o God's Lake Gold Mines, Ltd., 395 Main St., Winnipeg, diamond drilling. $60,000.

Man., Portage La Prairie—OIL REFINERY—J. W. Sykes, Portage La Prairie, oil refinery. $50,000.

Man., Winnipeg—PLANT—Motor Coach Industries, Ltd., 7 St. Mathews St., 85 x 191 ft., steel, brick mfg. plant, concrete fdn. $50,000.

N. B., Bathurst—MILL—Gloucester Lumber & Trading Co., Ltd., Bathurst, sawmill, etc. $50,000. Geo. Eddy Ltd., Bathurst, engr.

N. B., Siegas—MILL—Siegas Lumber Ltd., c/o E. Levesque, Siegas, sawmill and allied plant construction. $40,000.

Newfoundland, Burin — PLANT — Fishery Products, Ltd., Burin, fresh fish fillets cold storage and freezing plant. $40,000.

Newfoundland, Harbour Grace—PLANT—Newfoundland Paper Bag Mfg. Co. Ltd., Harbour Grace, paper bag mfg. plant. $60,000.

Newfoundland, Harbour Grace — COLD STORAGE PLANT—North Eastern Cold Storage, Ltd., Harbour Grace, cold storage plant. $50,000.

Newfoundland, Ramea — PLANT — John Penny & Sons, Ltd., Ramea, cold storage plant. $45,000.

Newfoundland, St. Anthony—PLANT—Job Brothers & Co., Ltd., St. Anthony, fresh fish fillet cold storage and freezing plant. $50,000.

INDUSTRIAL BLDGS. (Proposed Work, Cont'd.)

Newfoundland, St. Johns—DIAMOND DRILLING—Labrador Mining and Exploration Co. Ltd., 360 St. James St., Montreal, Que., diamond drilling on sulphide masses in vicinity of Andre-Marten and Gauthier Lakes. $100,000.

Newfoundland, St. John's—FACTORY—Owner, c/o Newfoundland Industrial Development Bd., St. John's, wallboard factory. $50,000.

N. S., Hebron—PLANT—Leslie Crosby, Hebron, woodworking plant. $40,000.

North West Territory, Yellowknife—DIAMOND DRILLING—LaSalle Yellowknife Gold Mines, Ltd., 414 Bay St., Toronto, Ont., deep diamond drilling program. $50,000.

Ontario—DIAMOND DRILLING—Northern Canada Mines, Ltd., 44 Victoria St., Toronto, diamond drilling in central part of Michaud Twp. $50,000.

Ontario—DIAMOND DRILLING—Wilcarr Mines, Ltd., c/o N. C. Mines, Ltd., 44 Victoria St., Toronto, diamond drilling along boundary between Wilkie and Carr Twps. $18,000.

Ont., Ancaster—PLANT—Ancaster Co-operative Assn., c/o R. C. Young, Ancaster, vegetable, etc. processing plant. $40,000.

Ont., Bradford—PLANT—M. L. Catania, 5 Church St., Toronto, cold storage plant. $40,000.

Ont., Brampton—PLANT—Apple Products Glen Williams, Ltd., c/o W. S. Campbell, K. C., 83 Gloucester St., Toronto, fruit and vegetable, etc. processing plant. $40,000.

Ont., Brockville — FACTORY — Caldwell Linen Mills Ltd., Brockville, 95 x 240 ft. factory exten. $100,000.

Ont., Chatham — PLANT — International Harvester Co. of Canada, Ltd., Chatham, plant addn. $49,000.

Ont., Exeter—SERVICE STATION, etc.—W. Fritz, Surich, service station, garage and repair shop. $40,000.

Ont., Fauquier — PLANT — Moonbeam Farmers Co-operative Inc., c/o C. Meilleur, Fauquier, vegetable, etc. processing plant. $40,000.

Ont., Guelph—FACTORY—Hi-Grade Metal Products Ltd., 7 Baker St., factory. $40,000.

Ont., Hamilton—SERVICE STATION—Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, 70x150 ft. service station, etc. $40,000.

Ont., Horning's Mills—FLOUR MILL, etc.—Andrew Morden, Horning's Mills flour mill, rolling mill, chopping mill. $40,000.

Ont., Kincardine — PLANT — Kincardine District Co-Operative, Inc., Kincardine, vegetables, etc. processing plant. $40,000.

Ont., Long Branch (Postal Dist. Toronto)—FACTORY—Lowe Bros. Co. Ltd., 283 Sorauren Ave., Toronto, plans by J. C. Meadowcroft, 1154 Beaver Hall Sq., Montreal, Que., factory, Lakeshore Rd. $100,000. CD 12/1/43—ENR 12/9/43.

Ont., Long Branch (Postal Dist. Toronto)—PLANT—Murphy Paint Co., 2740 St. Patrick St., Montreal, Que., plans by J. C. Meadowcraft, 1154 Beaver Hall Sq., Montreal, Que., plant. $450,000.

Ont., Oakville—FACTORY—Air Coils, Ltd., Colborne St. W., plans by Molesworth & Secord, 18 Toronto St., Toronto, 50 x 200 ft. factory with basement, 40 x 40 ft. office wing with bsmnt., Rebecca and Brant Sts. $60,000.

Ont., Oakville—FACTORY—Manning Bowman & Co., Simcoe St., Toronto, factory. $40,000 or more.

Ont., Paris—PLANT—Medusa Products of Canada, Ltd., Spruce St., plant expansion, incl. installing equip. $400,000. J. F. Cameron, Canadian Managing director, Paris, engr.

Ont., Port Hope—SMELTER—Owner, c/o Smith-Hinchman & Grylls, Inc., archts., 800 Marquette Bldg., Detroit, Mich., U. S. A., beryllium copper mfg. smelter. No plans initiated.

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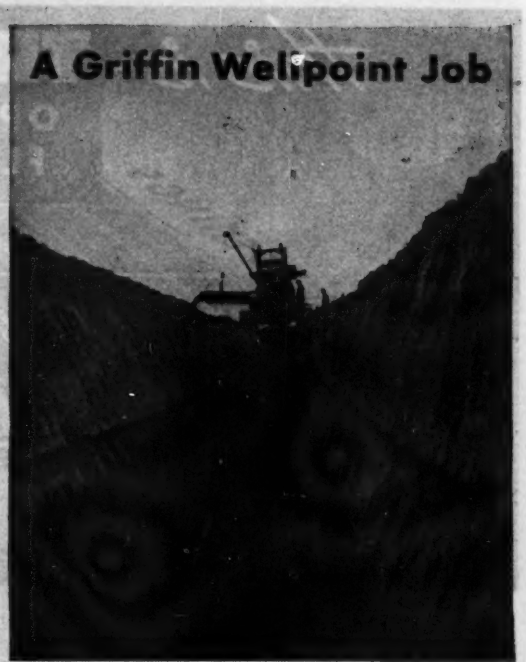

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INDUSTRIAL BLDGS. (Proposed Work Cont'd.)

Ont., Seaforth—PLANT—Boshart & Son, Seaforth, plant addn. $40,000.

Ont., Toronto—FACTORY—Gavi Co. Ltd., 372 Bay St., revised plans by Krum, Young & Co., Ltd., 67 Yonge St., factory addn., Commissioner St. $200,000.

Ont., Toronto—PLANT—Gelatin Products Ltd., Windsor, plant, Danforth Rd. $55,000.

Ont., Toronto—WAREHOUSE, etc.—H. J. Heinze Co. of Canada, Ltd., 115 George St., plans by Hutton & Souter, 26 James St. S., Hamilton, warehouse and office bldg., $150,000.

Ont., Toronto—FACTORY—Radium Luminous Industries, Ltd., 102 Church St., plans by N. A. Armstrong, 19 Melinda St., 1 story, 50 x 75 ft., brick, structural steel factory, rein.-con. fdn. $40,000.

Ont., Toronto—PLANT—Soren Mfg. Co. Ltd., 11 Brant St., plans by I. M. Saunders, 28 Queen St. E., 2 story, bsmt., 50 x 150 ft., brick, steel, plant, concrete fdn., Brant St. $80,000.

Ont., Walkerton—SAW MILL, etc.—Bogdon & Gross Furniture Co. Ltd., Walkerton, saw mill, etc. $40,000.

Ont., Walkerville—PLANT—Dom Forge & Stamping Co. Ltd., 2480 Siminole St., remodeling plant. $40,000.

Ont., Wallaceburg—PLANT—Hazzard Ice & Fuel Co., G. Hazzard, mgr., Wallaceburg, 25x105 ft. ice plant, brick, concrete, tile, concrete fdn. $45,000.

Ont., Weston—PLANT—Moffat's, Ltd., 22 Dennison Ave., plans by Prack & Prack, Pigott Bldg., Hamilton, plant exten. $50,000.

Ont., Windsor—PLANT—Acme Refrigeration Supply Co. ltd., c/o J. E. Start, K.C., Windsor, refrigeration equipment mfg. plant. $40,000. $40,000.

Ont., Windsor—FACTORY—Howitt Battery & Electric Service Co. Ltd., 347 W. Sandwich St., plans by J. C. Pennington, Commerce Bank Bldg., plant. $40,000. CD 4/17—ENR 4/27.

Que., Joliette—FACTORY—Fernhill Ltd., 146 St. Thomas St., plans by M. W. Roth, 204 W. Notre Dame St., Montreal, 1 story, 80x140 ft. worsteds and linen mfg. plant. $40,000.

Que., Louricourt—DIAMOND DRILLING—Louricourt Goldfield. Ltd., 1604 Aldred Bldg., Montreal, diamond drilling. $140,000.

Que., Montreal—GARAGE—Fortier Garage, Ltd., 5049 E. Notre Dame St., garage, Adam St. $40,000.

Que., Montreal—FACTORY—W. D. Armstrong & Co., 386 W. Craig St., factory. $40,000.

Que., Montreal—PLANT—City Wire & Iron Products Co., Inc., 1590 E. Laurier Ave., plant. Site purchased.

Que., Montreal — FACTORY — Thermoset Plastics, Ltd., c/o D. Johnson, 10 St. James St., factory. $40,000.

Que., Rouyn—SHAFT—Rouyn Merger Gold Mines, Ltd., Rouyn, shaft and mine structures. $75,000.

Que., Quebec City—WAREHOUSE— W. Laframboise & Co. Ltd., 33 St. Pierre St., warehouse, Conway St. $45,000.

Que., Three Rivers—PLANT—Dufresne, Ltd., 765 Bonaventure St., bottling plant. $100,000.

Sask., Taylorton—MINE BLDGS.—Man. and Sask. Coal Mines Ltd., Taylorton, mine bldgs. $40,000.

BIDS ASKED

Bids Asked December 18

Pa., Phila.—LOCKER BLDG., etc.—Gulf Oil Co., Refinery Div., R. C. Roether, engr., 30 and Penrose Sts., 1 story, brick on cinder block locker and foreman's bldg., addn. to locker and foreman's bldg., office bldg. for Naval inspectors.

Que., Montreal — FACTORY — Dominion Lock Co., Ltd., 3330 St. Ambroise St., 4 story, 100x180 ft., steel, brick factory, rein.-con. fdn., $40,000. M. J. Doran, 4700 Cote des Neiges Rd., archt. CD 11/3—ENR 11/9.

Bids Asked December 19

Tex., Houston—FREIGHT DEPOT—International & Great Northern R. R. Co., C. S. Kirkpatrick, ch. engr., Union Station, 350 ft. rein.-con. frame, brick freight depot, $100,000. CD 11/15—ENR 11/23.

Bids Asked In January

Neb., Omaha—FACTORY—Katzman Bros. Furn. Mfg. Co., 1113 N. 13 St., 1 story, 150x324 ft., masonry factory addn. Over $50,000. E. J. Sesninghaus, 514 Paxton Bldg., archt.

Bids Asked

Me., Bangor—GARAGE—Joseph H. Fleming Co., 57 Oak St., 1 story, 50x90 ft., brick, concrete garage addn. Approx. $40,000 with equip. F. A. Patterson, 15 Central St., archt.

★ **Miss., Jackson** — OIL REFINERY — Rogers Lacy & Associates, Longview, Tex., oil refinery plant. $1,000,000.

Pa., Phila.—BOTTLING PLANT—Alexander Young Distilling Co., S. Margulis, pres., 719 S. 4 St., addnl. bottling plant facilities, alterations. $50,000. L. Magaziner, 1701 Walnut St., archt.

INDUSTRIAL BLDGS. (Bids Asked, Cont'd.)

Tex., Fort Worth—PLANT CAFETERIA—Austin Co., engrs.-archts., Clifford Ave., cafeteria, for Consolidated-Vultee Aircraft Corp., Grants Lane. $150,000.

CONTRACTS AWARDED

Colo., Denver—PLANT—Inland Paper Box Co., 1631 Wazee St., 1 story, part bsmnt., 90 x 200 ft., brick plant, to N. G. Petry, Denham Bldg. Est. $350,000 or more. R. L. Stoner, Insurance Bldg., archt. CD 10/31—ENR 11/2.

Ill., Cicero — REPAIR SHOP — Chicago, Burlington & Quincy R. R. Co., R. R. Clarke, ch. engr., 547 W. Jackson Blvd., Chicago, 1 story, 80x320 ft., repair shop, brick, concrete, steel, to J. W. Snyder Co., 207 N. Michigan Ave., Chicago, about $200,000. Bids 11/27. CD 11/22—ENR 11/30.

Ia., Ottumwa—PACKING PLANT—Morrell & Co., Ottumwa, packing plant addn., to Stark Building Co., P. O. Box 369, Cedar Rapids, approx. $150,000. D. D. Morgan, 105½ Jefferson St., Burlington, engr.

La., Shreveport—PLANT—Swift & Co., Union Stockyards, Chicago, Ill., packing plant, to McConnell & Whitaker, 144 Patton Ave. $40,000.

Mass., Boston—PLANT—New York, New Haven & Hartford R. R. Co., E. E. Oviatt, ch. engr., Yellow Bldg., Water St., New Haven, Conn., brick, steel, diesel locomotive shop, to Tredennick Billings Co., 10 High St. Est. $40,000. Bids 11/29. CD 11/27—ENR 11/30.

Mass., Charlestown (sta. Boston)—COAL STORAGE, etc.—C. H. Sprague & Son Co., 10 Post Office Sq., Boston, 32x200 ft., timber coal storage shed and bins, to J. H. Proctor Co., 89 Broad St., Boston, approx. $40,000.

Mass., Worcester—BUS GARAGE—Worcester Street Railway Co., 107 Main St., 1 story, 75 x 125 ft., brick, concrete bus garage addn., incl. machine shop., Sagamore Rd. Owner builds. G. Adolphe Johnson, 390 Main St., archt.

Mich., Watervliet—FACTORY—Watervliet Paper Co., Watervliet, brick, steel, concrete factory addn. to paper mill, to Getman Bros., South Haven. Est. $50,000. L. C. Kingscott & Associates, Kalamazoo, archts.

Mo., Gardner — ROUNDHOUSE — Chicago, Milwaukee, St. Paul & Pacific R. R. Co., W. H. Penfield, ch. engr., Union Sta., Chicago 6, Ill., roundhouse exten., to Universal Const. Co., Scarritt Bldg., Kansas City, Mo., $80,000.

Mo., St. Louis—PLANT—The Essmueller Co., 1220 S. 9 St., Zone 4, 1 story, bsmnt., 66x120 ft., brick shops bldg. addn., concrete fdn., to Voelpel Building Co., 1113 Sidney St., Zone 4. Est. $40,000 with equip.

Mo., St. Louis — FOUNDRY — National Foundry & Machine Co., 3625 South Bway., Zone 11, 1 story, 104x134 ft., and 34x75 ft., brick, steel non-ferrous foundry bldg., on existing fdns., 7815 Alabama Ave., separate contracts. $40,000 with equip.

Mo., St. Louis—FACTORY—Valley Furniture Co., 326 North 21 St., Zone 7, 1 story, 32x83 ft., and 32x37 ft., brick factory, concrete fdn., to Geo. Moeller Constr. Co., 3007 Wyoming St., Zone 16. Est. $40,000 with equip. Froese & Maack, 705 Olive St., Zone 1, archts. CD 10/23—ENR 10/26.

N. J., Bayonne—LAUNDRY—Community Pride Laundry, 761 Broadway, 2 story, bsmnt., brick, concrete block laundry, to S. Palmisano Sons, 671 Avenue E. $40,000. B. D. Singer, 15 Benmore Terr., archt.

N. J., Irvington—FACTORY—Gould & Eberhardt, 433 Fabyan Pl., 1 and 2 story, brick factory addn., to Stevens Const. Co., 973 Broad St., Newark. $42,000. E. Gorham, 703 Penn Ave., Teaneck, archt.

N. J., Trenton — PLANT — Trenton Container Co., Lalor and Hancock Sts., mfg. plant, to Karno-Smith Co., Inc., Broad St. Bank Bldg. $80,000. Awarded 11/27.

O., Cleveland—LABORATORY—American Gas Assn., R. M. Conner, mgr., 10306 E. 62 St., testing laboratory, to James C. F. Shafer Co., Caxton Bldg. Est. $40,000. Osborn Engr. Co., 7016 Euclid Ave., engrs.-archts. CD 10/31—ENR 11/2.

O., Cleveland—PLANT IMPROVEMENTS—Superior Foundry Co., W. Candee, asst. to pres., 3542 E. 71 St., plant improvs., new cupolas, roller conveyor, 250 ft. long tram rail with 2½ ton hoist and foundation work, to National Engrg. & Contg. Co., W. 4 St. and Central Ave. Est. $300,000.

O., Rossford—PLANT IMPROVEMENTS—Libbey-Owens-Ford Glass Co., Nicholas Bldg., Toledo, plant improvs., installing electric furnace with auxiliary equip., to Stone & Webster Engrg. Corp., 49 Federal St., Boston, Mass. Est. $203,000.

Pa., Eddystone—PLANT—Baldwin Locomotive Works, Eddystone, steel, tile plant, own forces. $50,000. H. M. Wilson Co., 18 and Brandywine Sts., Phila., consult. engrs. CD 11/29—ENR 12/7.

Pa., Phila.—MANUFACTURING—Electric Storage Battery Co., 19 St. and Allegheny Ave., altering mfg. bldgs. at 19 St. and Allegheny Ave. plant, and at Crescentville plant, to Wm. F. Lotz, 4700 Frankford Ave. $45,000 each. Awarded 11/30.

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INDUSTRIAL BLDGS. (Contracts Awarded, Cont'd.)

Pa., Phila.—WAREHOUSE—John T. Lewis & Bros. Co., 2545 Aramingo Ave., converting 1 story bldg. to warehouse and adding 3 stories to same, to Turner Constr. Co., 1500 Walnut St. $350,000. Awarded 12/1.

Pa., Phila.—LOCKER ROOM—Philadelphia Record, Broad and Wood Sts., locker rooms addns., alterations, to J. S. McQuade, 1218-22 Parrish St. $42,000. R. B. Bencker, 1601 Chestnut St., archt. Awarded 11/30.

Tex., Edcouch—PLANT—F. A. Smith, 108 Vermont St., Mercedes, citrus and vegetable packing plant, rein.-con., day labor. $40,000. CD 12/6.

Tex., Edinburg—PLANT—Polia & Hagan, Edinburg, citrus and vegetable packing plant unit, force account. $45,000. CD 11/29—ENR 12/7.

Tex., San Benito—PLANT—Porter & H. Wintz, Inc., Maltby Bldg., Brownsville, citrus and vegetable packing plant units, to Port Industries, c/o Turning Basin, Brownsville, approx. $42,000. CD 11/25—ENR 12/7.

Wash., Tacoma — STOP, etc. — Chicago, Milwaukee, St. Paul & Pacific Ry. Co., W. H. Penfield, ch. engr., Union Sta., Chicago 6, Ill., rein.-con. bldgs., pile fdns., to house motor shop, 51x230 ft., locker room, 36x64 ft., etc., to Roy T. Earley Co., 281 Middle Waterway. $150,000. CD 11/14—ENR 11/16.

Wis., Kaukauna—FOUNDRY—Kaukauna Mach. Corp., 1000 Lincoln Ave., structural steel, concrete block foundry addn., concrete fdn., to Hennes & Glaff Const. Co., Kaukauna.

Wis., Oshkosh—WAREHOUSE—Stadtmueller Implement Co., 77 Jackson Dr., 1 story, concrete block, brick farm implement warehouse, concrete fdn., to P. Rasmusson & Son, 505 Central Ave.

Alaska, Cordova—CANNERY, etc.—New England Fish Co, Spokane St Terminal, Seattle, Wash., design and construction 1 story, 60x360 fish cannery and 3 story warehouse, to Howard S Wright & Co, 407 Yale Ave. N., Seattle, Wash. Est. $684,118.

Ont., Toronto—PLANT—Standard Steel & Iron Works, Inc., 3402 W. Dundas St., 50x80 ft., brick, steel plant addn., concrete fdn., day labor. $40,000.

Que., Montreal—PLANT—Brunelle Ltd., 1464 Prefontaine St., structural steel frame, ice storage plant, rein.-con. fdn., day labor. $100,000.

Que., Victoriaville—FACTORY—J. E. Hebert, Onc., 6 Aqueduct St., sash and door factory, etc., to J. E. Blais, 2 Desire St. Est. $40,000.

UNCLASSIFIED

PROPOSED WORK

Arkansas—RURAL POWER LINE—Arkansas Power & Light Co., Simmons National Bldg., Pine Bluff, 108.3 mi. rural power line, Garland Co. $99,498.

Kentucky — SERVICE EXTENSIONS — Farmers Rural Electric Cooperative Corp., Inc., Glasgow, service extens., Barren Co. $100,000.

Kentucky — SERVICE EXTENSIONS — Shelby Rural Electric Cooperative Corp., Shelbyville, service extensions, Shelby Co. $80,000.

†**La., Kenner**—RUNWAYS, etc.—U. S. Eng., Avenue F and 25 St., Galveston, Tex., exten. runways and outside night lighting sys. at Moisant Airfield. Over $100,000.

★**Louisiana and Tennessee**—GAS PIPE-LINE, etc.—Memphis Natural Gas Co., Sterick Bldg., Memphis, Tenn., and Monroe, La., bids soon 295 mi. 16 in. transmission pipeline between Memphis, Tenn. and Monroe, La., $7,500,000; plans exten. 50 mi. 16 in. gas pipeline carrier between Monroe and Lisbon, La., $350,000; 61½ mi. natural gas looped lines between Monroe, La. and Memphis, Tenn. $200,000. CD 9/21—NR 9/28.

†**La., Camp Livingston**—RANGES—U. S. Eng., 300 Bway., Little Rock, Ark., army combat ranges and village battle course. Over $25,000.

Michigan — SERVICE EXTENSIONS — Presque Isle County Electric Cooperative Assoc., Onaway, service extens., Presque Isle Co. $75,000.

Mississippi — SERVICE EXTENSIONS — Yazoo Valley Electric Power Assoc., Yazoo City, service extens., Yazoo Co. $25,000.

Missouri — SERVICE CONNECTIONS — Grundy Electric Cooperative, Inc., Trenton, service connections, Grundy Co. $25,000.

N. J., Manasquan—BOARDWALK—Borough, Borough Hall, 900 ft. boardwalk, incl. timber ramps, leading to boardwalk, from street. $25,000. J. Vannuys, 57 Minerva Ave., engr.

Ohio—SERVICE EXTENSIONS—Buckeye Rural Electric Cooperative, Inc., Gallipolis, service extens., Gallia Co. $26,000.

Ohio—SYSTEM IMPROVEMENTS—Firelands Electric Cooperative, Inc., New London, imprv. sys., Huron Co. $50,000.

South Carolina—SERVICE EXTENSIONS—Tri-County Electric Cooperative, Inc., St. Matthews, service exten., Calhoun Co. $40,000.

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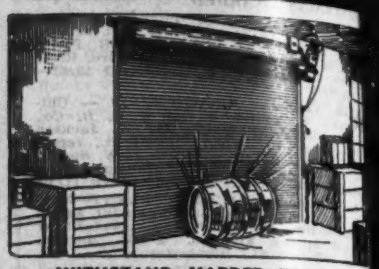

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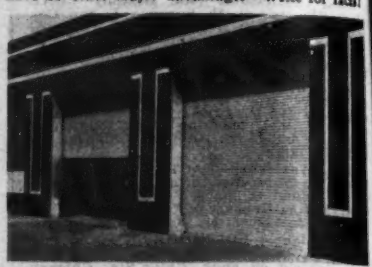

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UNCLASSIFIED (Proposed Work, Cont'd.)

Texas — PIPELINE — Gulf Refining Co., Gulf Bldg., Houston, 62 mi. 8 in. pipeline carrier from vicinity of Wink to Midland, $200,000.

†Tex., Camp Maxey (br. Paris)—FENCING, etc.—U. S. Eng., 231 W. Main St., Dennison, fencing and gates, for prisoner of war stockade, Area 18, Ser. 41-242-45-55. Over $25,000.

Tex., Rio Hondo—SWIMMING POOL, etc.—Lower Rio Grande Valley Council, Boy Scouts of America, c/o C. Tandy, Hy. 4, Brownsville, boy scout camp imprvs., incl. outdoor circulating swimming pool, storage bldg., pier, rifle range, drainage sys., roads, $75,000. J. A. Pitzinger, S.W. Life Bldg., Dallas, archt. CD 5/17—ENR 5/25.

Alta., Barnwell—TRANSMISSION LINE—Canadian Western Natural Gas, Light, Heat & Power Co., Calgary, 2½ mi. transmission line and distr. sys. $100,000.

N. B., Moncton—PARK DEVELOPMENT—Province of New Brunswick, Fredericton, national park development, Albert Co. $150,000.

N. B., Petitcodiac—LIGHTING SYSTEM—Municipality, H. A. Church, secy., Petitcodiac, lighting sys. $30,000.

Newfoundland, St. John's—PARKS, etc.—Permanent Town Planning Comn., St. John's, parks and playground construction. $75,000.

Ont., Galt—SWIMMING POOL—Municipality, swimming pool. $40,000. CD 1/18—ENR 1/20.

Ont., Kitchener—CONDUIT SYSTEM—Utilities Comn., H. J. Graber, chn., Kitchener, preparing plans reconstructing underground electrical conduit sys., Queen and Frederick Sts. $75,000. M. Pequegnat Utilities Comn., Kitchener, engr.

Ont., Ottawa—LIGHTING SYSTEM—Municipality, lighting sys. King Edward Ave. and St. Patrick St. $25,000. Ottawa H. E. Comn., Bank St., engrs.

BIDS ASKED

Bids Asked In December

†Ia., Grandview—CONTROL TOWER, etc.—U. S. Eng., 10 E. 17 St., Kansas City, Mo., control tower; crash truck station, at Airbase.

Bids Asked December 21

La., Alexandria—FIRE ALARM SYSTEM, etc.—City Council, City Hall Bldg., installing fire alarm and traffic signal sys. L. F. McGee, Alexandria, engr.

†N. Y., Niagara Falls—NIGHT LIGHTING—U. S. Eng., 120 Wall St., New York, Zone 4, night lighting sys. $30,000.

Wis., Janesville—HANGAR, etc.—Rock Co. Court House, 2 story, 85 x 85 ft., brick, tile, hangar, shop and storage bldg., concrete fdn. Plans deposit $10. Law, Law, Potter & Nystrom, 121 S. Pinckney St., Madison, archts. CD 5/9—ENR 5/11.

Bids Asked Before January 1

Texas—GAS PIPELINE—Glenn H. McCarthy, Sterling Bldg., Houston, 35 mi. 10¾ in. natural gas (stripped) pipeline carrier between Winnie and Beaumont, Port Arthur, Port Neches, $100,000. CD 11/30—ENR 12/7.

Bids Asked

†Tex., Kelly Field (br. San Antonio)—LOOPED NATURAL GAS SYSTEM—U. S. Eng., Fort Sam Houston, 22,500 lin. ft. looped natural gas sys., for air depot area, bar. No. 41-154-45-48. Low bidders refused contract. CD 11/21—ENR 11/30, under LB.

LOW BIDDERS

†Calif., Doyle—SPRINKLER SYSTEM—U. S. Eng., 1209 8 St., Sacramento, Zone 3, sprinkler sys. in warehouses, Sierra Ordnance Depot, Job No. 1003, from MacDonald & Kahn, Inc., 200 Financial Center Bldg., San Francisco, $386,000.

†Calif., Hamilton Field—PASSENGER TERMINAL—U. S. Eng., 74 New Montgomery St., San Francisco, passenger terminal Job No. 1775-7, from MacDonald & Kahn, Inc., 200 Financial Center Bldg., San Francisco, $150,000.

Calif., Long Beach — GAS STORAGE TANKS—City Gas Dpt., 215 W. Bway., Zone 3, fabrication, construction, erection incl. necessary fdns., for installation 4 high pressure gas storage tanks of discharge capacity of approx. 500,000 cu. ft. each at Spring St. and Junipero Ave., from Bethlehem Steel Co., E. Slauson Ave., Vernon, $307,000. CD 5/5—ENR 5/11.

†Calif., San Bernardino—RAILWAY TRACKAGE, etc.—U. S. Eng., 751 S. Figueroa St., Los Angeles, Zone 14, Dec. 5, railway trackage, etc., Ono-Sub-Dept. No. 36, from Geo. E. Kerns, 5574 Atlantic Ave., Long Beach, $84,644.

†Calif., Wilmington — LOADING PLATFORM—U. S. Eng., 751 S. Figueroa St., Los Angeles, Zone 14, Dec. 2, loading platform, paving and railroad spur for Ordnance Filler Depot, Port of Embarkation, No. 74, from J. A. Terteling Sons Co., 411 W. 8 St., Los Angeles, $73,314.

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†La., Barksdale Field (br. Shreveport)—PARKING APRON—U. S. Eng., 300 Bway., Little Rock, Ark., concrete parking apron, Inv. 03-056-45-34, from Austin Road Co., P. O. Box 1590, Dallas 1, Tex., $288,138. CD 11/8—ENR 11/16.

La., Winnfield — ELECTRIC GENERATING and DISTRIBUTION SYSTEM, etc.—Town, c/o Mayor, Nov. 21, electric distr. sys. and substation for Unit 4, from Electric Shop, 129 Main St., Baton Rouge, $121,120; diesel engine generating unit, auxiliary equip., etc., for Unit 2, from Maxwell Jones Engineering Co., Carondelet Bldg., New Orleans, $89,088. CD 10/18—ENR 10/26.

†Mass., South Boston (sta. Boston)—WHARF—U. S. Eng., 31 St. James Ave., Boston, Dec. 4, wharf, Spec. 19-023-45-NEG 62, from Berke Moore, Inc., 11 Boylston St., Brookline, $40,300.

N. J., Atlantic City—BOARDWALK—City, City Hall, 1 mi. boardwalk between George and Albany Aves., from O. Hansen, 7215 Atlantic Ave., Ventnor, $89,290.

Oregon—POWER LINE—Douglas Electric Cooperative, Medical Bldg., Roseburg, Nov. 28, 43 mi. power line between Eugene and Drain, Ore. 10-17-B1-Douglas, from Tice Electric Co., 903 S.E. Hawthorne Blvd., Portland, $121,416. REA. Flora Engineering Co., Russell Bldg., Cheyenne, Wyo., engrs.

†Utah., Ogden—AUTOMATIC SPRINKLERS—U. S. Eng., 1209 8 St., Sacramento 8, Calif., Nov. 28, automatic sprinklers in various bldgs., at Ogden Arsenal, Spec. 1004, from Century Sprinkler Corp., 305 Graham St., Richmond, Va., $172,222.

†Tex., Kelly Field (br. San Antonio)—NATURAL GAS SYSTEM—U. S. Eng., Fort Sam Houston, looped natural gas sys., Ser. No. W-41-154-45-48, from R. Smith, Waco, $26,660. CD 12/7.

†Va., Cameron (mail Alexandria)—SPRINKLER SYSTEM—U. S. Eng., 1 and Douglas Sts. N.W., Wash. 25, D. C., Dec. 8, sprinkler sys. for quartermaster warehouse, from Century Sprinkler Corp., 305 Graham St., Richmond, $146,896.

CONTRACTS AWARDED

†Ark., Camden — AIR-CONDITIONING — Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., air-conditioning ordnance plant, to Associated Mechanical Contractors, 224 Summer St., Dallas, Tex., $86,000. Fraser-Brace Engineering Corp., 10 E. 40th St., New York, N. Y., engrs.

†Calif., Benicia — SPRINKLER PROTECTION—U. S. Eng., 74 New Montgomery St., San Francisco, Zone 19, sprinkler protection for dock. Contr. W-04-203-eng-1317, Benicia Arsenal, to Geo. M. Robinson & Co., 451 Folsom St., San Francisco, $92,300.

Calif., Burbank—HANGAR DOORS—Lockheed Aircraft Corp., Burbank, installing hangar doors on Bldgs. 330 and 331, Plant B-6, to H. M. Keller Co., 4604 Hollywood Blvd., Los Angeles, $74,000. D. B. Parkinson, 433 S. Spring St., Los Angeles, archt.

†Calif., Hamilton Field—HANGAR FOUNDATIONS—U. S. Eng., 74 New Montgomery St., San Francisco, Zone 19, hangar fdns., Contr. W-04-203-eng-1554, to W. D. Rapp, Santa Rosa, $36,319.

★**†Colo., Lowry Field (P. O. Denver)**—AIRPORT FACILITIES—U. S. Eng., 909 17 St., Denver, addnl. airfield facilities, to Peter Kiewit Sons' Co., 1024 Omaha National Bank Bldg., Omaha, Neb., and Big Horn Constr. Co., Sheridan, Wyo., $775,028.

★**†Calif., March Field (br. Riverside)**—RUNWAYS, etc.—U. S. Eng., 741 S. Figueroa St., Los Angeles, Zone 14, runways, etc., Inv. 87, to Kiewit-Johnson-Everist, 650 South Grand Ave., Los Angeles, $2,171,126. CD 11/27—ENR 11/30.

★**†Calif., Maywood**—AUTOMATIC SPRINKLER SYSTEMS—U. S. Eng., 761 S. Figueroa St., Los Angeles, Zone 14, installing automatic sprinkler sys. in 27 warehouses, Army Air Forces Supply Depot, No. 45, to Hickman & Ritter, 2411 Charnwood Ave., Los Angeles, $835,111. Bids 11/13. CD 11/30—ENR 11/23, under LB.

†Fla., Barin Field (br. Pensacola)—AIR STATION REPAIRS, etc.—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., repairs, resurfacing, canal outlying field, Naval Auxiliary Air Station, NOY 10087, to Smith Engr. & Constr. Co., P. O. Drawer 1831, Pensacola, approx. $109,895.

†Ga., Atlanta—AIRPORT GRADING, etc.—U. S. Eng., Post Office Bldg., Savannah, grading, draining, Atlanta Municipal Airport. Contr. W-09-123-eng-494, to H. E. Wolfe Constr. Co., Inc., St. Augustine, Fla., $37,321.

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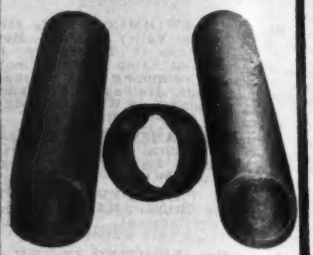

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UNCLASSIFIED (Contracts Awarded, Cont'd.)

Macon—FACILITIES—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., facilities, N.O.P., NOY 10016, to Hugh McMath Constr. Co., Brenaas Rd., Columbus, **$63,014.**

†**Ill., Galesburg**—SWIMMING POOL BLDG. —U. S. Eng., 512 Merchandise Mart, Chicago, swimming pool bldg., Mayo Gen. Hospital, Contr. W-11-032-eng-1854, to John Feimley Co., Bloomington, **$154,795.**

†**Ia., Clinton**—SWIMMING POOL, etc.— U. S. Eng., 1709 Jackson St., Omaha, Neb., swimming pool, bldg., filtration plant, to T. S. Willis, Janesville, Wis., **$137,771.**

†**Kan., Salina**—AIRFIELD EXCAVATION, etc.—U. S. Eng., 10 E. 17 St., Kansas City, Mo., airfield excav., etc., Smoky Hill AAF. Contr. W-33-038-eng-649, to C. H. Atkinson Paving Co., 1117½ S. 10 St., St. Joseph, Mo., $68,424.

†**Kan., Topeka**—AUTOMATIC SPRINKLER SYSTEM—U. S. Eng., 10 E. 17 St., Kansas City, Mo., composition automatic sprinkler sys., 382nd AAF Specialized Depot, Contr. W-33-038-eng-627, to Raisler Corp., 129 Amsterdam Ave., New York, N. Y. **$475,680.**

†**La., Camp Livingston**—FIRING POINTS —U. S. Eng., 300 Bway., Little Rock, Ark., constructing firing points, Contr. W-03-050-Eng-120, to Horton-Pollard, Bossier City, est. **$109,418.**

Mich., Willow Run—HANGAR, etc.—Packard Motor Car Co., E. Grand Blvd., Detroit, brick, steel, concrete hangar and flight test engineering facilities, to Bryant & Detwiler Co., 2348 Penobscot Bldg., Detroit. Est. **$500,000.** Giffels & Vallet, 1000 Marquette Bldg., Detroit, engrs.-archts

†**Miss., Camp Shelby** — AUTOMATIC SPRINKLER SYSTEM—U. S. Eng., Grant St., west of Westwood St., Mobile, Ala., installing automatic sprinkler sys., Contr. W-01-076-eng-554, to Texas Automatic Sprinkler Co., 2330 Summer St., Dallas, Tex., **$25,018.**

†**N. H., Manchester**—RADIO RANGE— U. S. Eng., 31 St. James Ave., Boston, Mass., radio range, No. 19/023-45-NEG 58, to F. Grande & Son, 425 Bway., Everett, Mass., **$46,500.** Est. $50,000. Bids 12/1.

†**N. M., Kirtland Field (br. Albuquerque)** —TRAINER BLDG., etc.—U. S. Eng., 4 and Gold Sts., Albuquerque, trainer bldg., relocating present bldgs., to E. Bridgeman, 316 S. Tulane St., **$89,595.** Bids 12/1, awarded 12/3. CD 11/21—ENR 11/30.

†**O., Cleveland** — SITE IMPROVEMENTS, etc.—U. S. Eng., 17 S. High St., Columbus, site imprvs., grading, road surfacing, for open storage area for storing material and equip., to Loesch & Green Constr. Co., 4311 W. 25 St. **$48,000.** CD 11/8—ENR 11/16.

†**O., Lacarne**—FIRE WALLS—U. S. Eng., 532 U. S. Post Office & Courthouse, Cincinnati, fire walls, Erie Proving Grounds, Contr. W-33-015-eng-546, to Mosser Const. Co., Fremont, **$27,011.**

†**O., Shelby**—SPRINKLER SYSTEM—U. S. Eng., 925 New Federal Bldg., Pittsburgh, Pa., sprinkler sys. for La Carne Air Supply Depot, to Grinnell Co., 1294 E. 55 St., Cleveland, **$49,000.**

†**O., Wright Field (br. Dayton)**—AUTOMATIC SPRINKLER SYSTEM—U. S. Eng., Wright Field, automatic sprinkler sys., Group A of Directive Consecutive No. 22141, Contr. W-33-046-eng-158, to Automatic Sprinkler Co. of America, Brittain St., Youngstown, **$83,980.**

†**Ore., Klamath Falls**—HANGAR—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., completing wood hangar, Naval Air Station, NOY 12378, to Waale-Camplan Co., 2100 S.W. Jefferson St., Portland, Ore., **$286,330.**

†**Tenn., Memphis**—SPRINKLER SYSTEM —U. S. Eng., Grant St., west of Westwood St., Mobile, Ala., installing automatic sprinkler sys., Memphis 830th ASF, Specialized Depot, Contr. W-01-076-eng-824, to Mississippi Automatic Sprinkler Co., 204 W. Fortification St., Jackson, Miss., **$84,871.** Bids 10/14. CD 9/28—ENR 10/5.

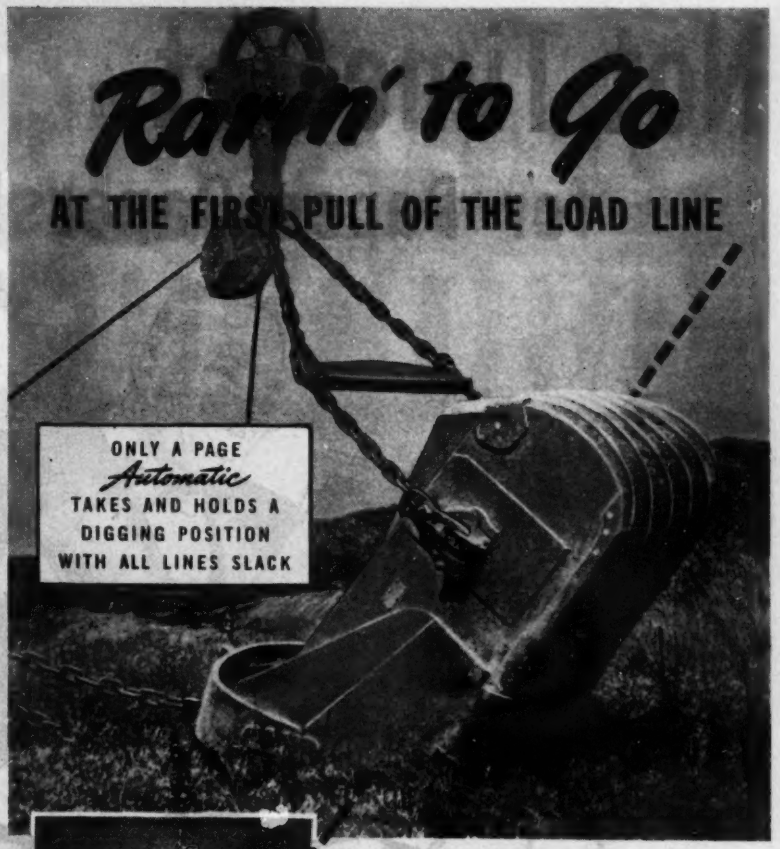
†**Tex., Texarkana**—SPRINKLER SYSTEM —U. S. Eng., 351 W. Main St., Denison, installing automatic sprinkler sys., Texarkana Ordnance Center, Contr. W-41-242-eng-371, to Marshall Constr. Co., Wilson Bldg., Dallas, **$50,367.**

†**Utah, Ogden** — SPRINKLER SYSTEM — U. S. Eng., 1209 8 St., Sacramento 8, Calif., constructing automatic sprinkler sys., Utah ASF depot, near here, Contr. W-04-167-eng-488, to Viking Automatic Sprinkler Co., 149 W 2 S St., and A. L. Eichols, 50 S.W. Temple St., both Salt Lake City, **$495,804.**

Ont., Kirkland Lake—RADIO STATION— Northern Broadcasting & Publishing Co. Ltd., 25 W. King St., Toronto, radio station, to Hill-Clark-Francis Ltd., 49 Government St., Kirkland Lake. Est. **$40,000.**

Que., Lapraire—RADIO STATION—A. Dupont, 5600 Stirling Ave., Montreal, radio station, to J. P. Desrochers Co., Ltd., 59 Strathern Ave., Montreal West. Est. **$25,-000.** P. Lemieux, 760 Victoria Sq., Montreal, archt.

Proposal Advertisements see p. 245 and 260
Postwar Projects see p. 162



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